

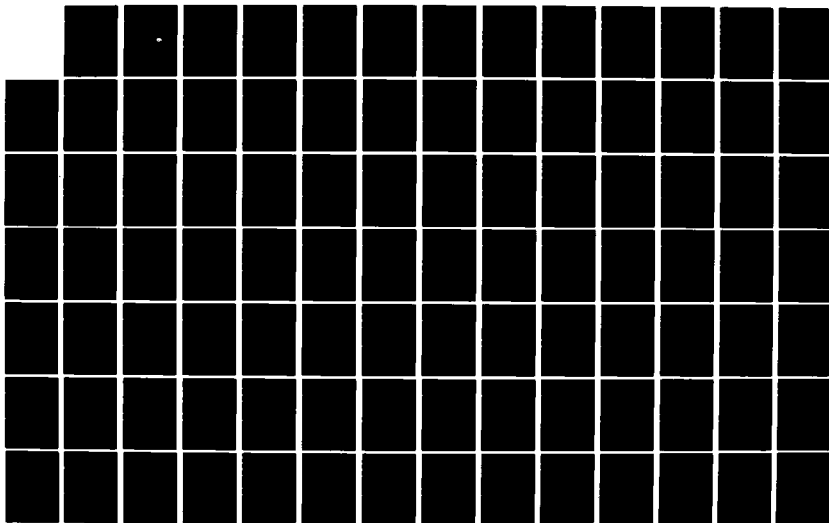
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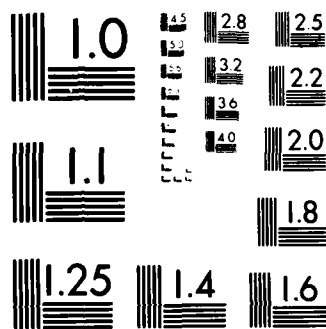
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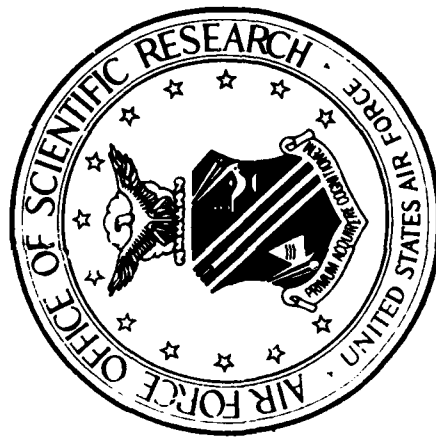
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INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

1) SUBJECT INDEX

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2) PERSONAL AUTHOR INDEX

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PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.



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The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 61102F) and the primary Air Force agency for the extramural support of fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

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Supplementary Note - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

Abstract - A brief summary describing the research of the report.

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Resolution of the A/B photoionization Branching Ratio Paradox for the C1202(+) B(000) State.
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Energetics and Dynamics of Radical Pairs in Micelles. Measurement of the Average Singlet-Triplet Energy Gap by Means of the Magnetic Field Dependence of (13)C CIDNP.
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AD-B084 703L CONTINUED

WOODWARD-CLYDE CONSULTANTS PASADENA CA

(U) Implications of Records from the Spall Zone of the Amchitka Tests to Nonlinear Losses in the Source Region and the Elastic Radiation by Spall.

DESCRIPTIVE NOTE: Annual technical rept. 15 Nov 82-15 Nov 83.

NOV 83 45P

PERSONAL AUTHORS: Burdick, L. J.; Lay, T.; Helmlinger, D. V.; Harkrider, D. G.;

REPORT NO. WCCP-R-84-03

CONTRACT NO. F49820-83-C-0028, ARPA Order-4692

MONITOR: AFOSR
TR-84-0821

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 9 Aug 84. Other requests must be referred to DARPA/TIO, 1400 Wilson Blvd., Arlington, VA 22209.

ABSTRACT: (U) The Amchitka nuclear tests MILROW and CANNIKIN were well recorded in the near field. Three component velocity records are available both from within the spall zone and from the near field elastic region. In previous work, the records from the elastic region were modeled using a point source and an elastic medium. In this work, the predictions of the elastic model are compared to the observed initial peak velocity from within the spall zone. The purpose was to attempt to observe the effects of nonlinear absorption by the medium due to the high strains and strain rates. The elastic model predicted the observations closely, indicating that the nonlinear effects are small while the material is under compression. Of course, when the medium is placed under tension by the free surface reflection, spallation occurs and nonlinear effects become very important. The effects of radiation by spall into the elastic region are also considered. Two finite source representations for the spall source are presented; these are a cone of shear dislocations and a disk of tension cracks. The spall event is shown to be the possible cause of a small arrival in the teleseismic P wavetrain and also the cause

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SANDIA NATIONAL LABS ALBUQUERQUE NM

(U) IEEE Pulsed Power Conference (4th) Held at Albuquerque,
New Mexico on 6-8 June 1983.

Magnetic switches, Stores(Inductive), Rotating machines,
Energy storage, WUAFDSR2301A7, PEB1102F

DESCRIPTIVE NOTE: Final rept.,

JUN 83 856P

PERSONAL AUTHORS: Rose, M. F.; Martin, T. H.;

CONTRACT NO. AFOSR-ISSA-83-00048

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-84-0692

UNCLASSIFIED REPORT

ABSTRACT: (U) Continuing its expansive growth, nearly 800 participants attended the 5th IEEE Pulsed Power Conference with 38 individuals from nine foreign countries - Canada, England, France, Israel, Japan, West Germany, Italy, Switzerland, and Denmark. The number of technical contributions was 220 resulting, for the first time, in a conference with four parallel sessions. In addition to the many fine comments on the technical content of the meeting, we received ample praise for the accommodations, special events and general excellence of the facilities at the Albuquerque Convention Center. It is with reluctance that we leave these facilities for the 1983 conference. The Executive Committee voted to hold the 5th IEEE Pulsed Power Conference in the Washington, D. C. area on June 10, 11, and 12, 1985. Frank Rose of the Naval Surface Weapons Center was elected as Conference Chairman with Peter Turchi, R and D Associates, as the Technical Program Committee Chairman.

DESCRIPTORS: (U) *Pulse generators, *Energy conversion, *Power supplies, *Symposia, Switching circuits, Pulse rate, Breakdown(Electronic threshold), Plasmas(Physics), Electric fuses(Ordnance), Thyratrons, Power, Spark gaps, Vacuum apparatus, Modulators, Diodes, Triodes, Explosives, Gases, Diodes, Pulses, New Mexico

IDENTIFIERS: (U) Capacitor banks, Homopolar generators,

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AD-A145 236 12/1

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Annual Report, Air Force Grant AFOSR-82-0275.

(U) Comment.

DESCRIPTIVE NOTE: Interim rept. 15 Jun 83-14 Jun 84,

JUN 84 4P

JUL 84 5P

PERSONAL AUTHORS: Carroll, R. J. ; Ruppert, D. ;

CONTRACT NO. AFOSR-82-0275

CONTRACT NO. F49620-82-C-0009, NSF-MCS81-00748

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A3

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0730

TR-84-0723

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The research project emphasized solving Elliptic-Parabolic Problems. Topics of special interest were: The extension of the basic theory of classical iterative methods; and The study of multigrid methods. This report summarizes progress in these areas to date. (Author)

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Statistical Association, v79 n386 p312-313 Jun 84.

Reprint: Comment.

DESCRIPTORS: (U) *Transformations(Mathematics),
*Statistical Inference, Models, Data processing, Reprints

DESCRIPTORS: (U) *Iterations, *Grids, Problem solving, Air Force research, Ellipses, parabolas

IDENTIFIERS: (U) *Multigrids, PE81102F, WUAFOSR2304A3

IDENTIFIERS: (U) Power transformation, PE81102F, WUAFOSR2304A5

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MASSACHUSETTS INST OF TECH CAMBRIDGE COMPUTATIONAL FLUID DYNAMICS LAB

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

(U) Computational Methods for Complex Flowfields.

(U) Development of a Production Order Release Methodology.

DESCRIPTIVE NOTE: Annual rept. 1 Jun 83-31 May 84,

DESCRIPTIVE NOTE: Final rept. 1 Sep 83-31 May 84,

JUN 84 67P

JUL 84 34P

PERSONAL AUTHORS: Murman, E. M.; Baron, J. R.;

PERSONAL AUTHORS: Medeiros, D. J.;

CONTRACT NO. AFOSR-82-0136

CONTRACT NO. AFOSR-83-0333

PROJECT NO. 2307

PROJECT NO. 2304

TASK NO. A1

TASK NO. D9

MONITOR: AFOSR
TR-84-0755

MONITOR: AFOSR
TR-84-0726

UNCLASSIFIED REPORT

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ABSTRACT: (U) The development of solution algorithms for complex flowfields is the continuing objective of the research. Major focus is on use of coupled subdomains and descriptions which are either preselected or adapted to fit the physical events when necessary. The non-adaptive embedded mesh algorithm has completed airfoil solutions with an allowance for highly stretched meshes, alternate grids and reducing smoothing. A new algorithm is combining features from cell and nodal-centered methods to permit general embedded topology. Adaptive embedded mesh procedures have been extended to and carried out for two-dimensional Euler, subsonic, transonic and supersonic flows. An optimal distribution of local Courant numbers has been considered as a basis for accelerating the solution approach to a steady state. (Author)

ABSTRACT: (U) The order release problem involves selecting subsets of available orders to release to the shop floor such that the system is utilized efficiently and queue time is reduced. A solution to this problem is proposed which combines Leontief flow models and linear programming in an iterative procedure. Examples of the approach are illustrated. (Author)

DESCRIPTORS: (U) *Numerical methods and procedures, *Algorithms, *Flow fields, *Computations, Airfoils, Subsonic characteristics, Transonic characteristics, Adaptive systems, Fluid dynamics

DESCRIPTORS: (U) *Mathematical models, *Management planning and control, *Production models, *Inventory control, Problem solving, Linear programming, Aircraft industry, Iterations, Routing, Efficiency, Assembly, Shops(Work areas), Queueing theory, Methodology

IDENTIFIERS: (U) Euler equations, WUAFOSR2307A1, PE61102F

IDENTIFIERS: (U) Leontief flow models, Flow models, WUAFOSR2304D9, PE61102F

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OKLAHOMA UNIV NORMAN SCHOOL OF INDUSTRIAL ENGINEERING

(U) Workload Demand and CNS Depressant Stressor Effects on Spatial Orientation Information Processing.

DESCRIPTIVE NOTE: Final scientific rept. 1 Apr 83-31 Mar 84.

JUL 84 77P

PERSONAL AUTHORS: Schlegel, R. E. ;

CONTRACT NO. AFOSR-83-0181

PROJECT NO. 2313

TASK NO. D9

MONITOR: AFOSR
TR-84-0759

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Southeastern Center for Electrical Engineering Education, St. Cloud, FL, Contract F49620-82-C-0035.

ABSTRACT: (U) An important element of piloting high-performance jet aircraft is the human ability to perform spatial orientation information processing, particularly when it involves the use of video display instrumentation. Spatial disorientation has consistently been the cause of numerous accidents throughout the history of flight. A study was conducted to further evaluate the Manikin Task, a complex reaction time task previously developed by the RAF as a test of spatial orientation. The objectives of the study were to (1) thoroughly evaluate the training characteristics of the task including variation in performance related to individual stimuli characteristics, (2) determine the task's speed vs. accuracy tradeoff characteristics, and (3) assess performance on the task under the influence of ethyl alcohol. Response times and accuracy were measured on five subjects under various conditions over a five-week period. Analysis of the data indicated a substantial dependence of response times on certain stimuli characteristics. In addition, there was a definite decline in accuracy corresponding to a forced decrease in response time. However, the relationship could not be adequately represented by the proposed speed-

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accuracy tradeoff functions. The effect of alcohol was evidenced primarily by a change in the slope of the speed-accuracy tradeoff relationship.

DESCRIPTORS: (U) *Information processing, *Reaction time, *Flight training, *Performance(Human), Accuracy, Measurement, Stimuli, Alcohol consumption, Workload, Air Force training

IDENTIFIERS: (U) Spatial orientation, WUAFOSR2313D9, PEG1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A145 205 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Total Positivity. A Review.

DESCRIPTIVE NOTE: Technical rept.,

JUN 84 20P

PERSONAL AUTHORS: Kim, J. S.; Proschan, F.;

REPORT NO. FSU-STATISTICS-M883, TR-83-159-AFOSR

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0717

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes AD-A133 691.

ABSTRACT: (U) The main objective of this paper is to review the concepts of total positivity, which plays an important role in various domains of mathematics and statistics. This article describes the power and scope of total positivity, and samples the great variety of fields of its applications. (Author)

DESCRIPTORS: (U) *Functions(Mathematics), *Statistical processes, Probability density functions, Set theory, Inventory, Statistical decision theory, Multivariate analysis, Reliability, Life tests

IDENTIFIERS: (U) Total positivity theory, WUAFOSR2304A5, PE81102F

AD-A145 188 7/3 8/1

WASHINGTON STATE UNIV PULLMAN DEPT OF CIVIL AND ENVIRONMENTAL ENGINEERING

(U) Effect of Toluene on the Solubility of Biohazardous Volatile Synthetic Organic Compounds.

DESCRIPTIVE NOTE: Final rept. 1 Jun 83-31 May 84.

JUL 84 38P

PERSONAL AUTHORS: Hindin, E.;

CONTRACT NO. AFOSR-83-0175

PROJECT NO. 2303

TASK NO. D9

MONITOR: AFOSR
TR-84-0780

UNCLASSIFIED REPORT

ABSTRACT: (U) The solubility of toluene, benzene, 1,1,2, trichloroethylene and p-cresol singly in high purity water at 20 degrees C was determined under dynamic and static conditions. Toluene present in an aqueous solution enhanced the benzene solubility, decreased the time for solubility to be attained and increased the rate at which solubility was attained. Toluene present in the water caused little difference in the time for 1,1,2 trichloroethylene to reach solubility equilibrium, but caused a more rapid rate in attaining solubility equilibrium and increased the solubility equilibrium concentration. The effect of toluene on the solubility kinetics of p-cresol was to reduce the time in attaining solubility equilibrium, increase the rate in achieving solubility equilibrium and caused little change in the solubility concentration. (Author)

DESCRIPTORS: (U) *Toluenes, *Solubility, *Toxic agents, Volatility, Solutions(Mixtures), Water, Benzene, Kinetics, Trichloroethylene, Paint removers

IDENTIFIERS: (U) Degreasers, PE81102F

AD-A145 205

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AD-A145 149 20/4 12/1 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F
AD-A145 149 CONTINUED

NOTRE DAME UNIV IN AERODYNAMICS LAB

(U) Aerodynamics of Airfoils Subject to Three-Dimensional Periodic Gusts.

DESCRIPTIVE NOTE: Final rept..

AUG 83 55P

PERSONAL AUTHORS: Atassi, H. ;

REPORT NO. 1983-12

CONTRACT NO. AFOSR-82-0269

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR
TR-84-0757

UNCLASSIFIED REPORT

ABSTRACT: (U) A general analysis of periodic three-dimensional vortical disturbances of streaming motions around streamlined and bluff bodies is developed using a unified approach wherein the mathematical problem is reduced to solving a single inhomogeneous wave equation with non-constant coefficients. In the limit of vanishing Mach number, the problem is formulated in terms of an inhomogeneous Fredholm integral equation of the second kind. The analysis is first applied to study the unsteady aerodynamics of an airfoil of arbitrary shape moving at low Mach number in a three-dimensional periodic gust pattern. Because the homogeneous equation has a non-trivial solution, a special procedure was developed for its solution and uniqueness is obtained by applying the Kutta condition at the trailing edge. Results were compared with those obtained from a nonlinear two dimensional gust theory and linear oblique gust analyses. Comparison shows a very strong influence of the airfoil geometry and mean flow angle of attack and of the gust parameters on the unsteady lift and moment coefficients. In fact, depending on the conditions considered, the unsteady lift and moment coefficients can be several times larger or smaller than those obtained from linear theories. A superposition principle was derived whereby the unsteady lift and moment acting on a thin airfoil

with small camber and small angle of attack and subject to a two-dimensional gust can be constructed by linear superposition to the Sears lift and moment of three independent components accounting separately for the effects of airfoil thickness, airfoil camber and non-zero angle of attack of the mean flow.

DESCRIPTORS: (U) *Unsteady flow, *Gusts, *Airfoils, *Mathematical models, Periodic variations, Blunt bodies, Streamline shape, Three dimensional flow, Integral equations, Angle of attack, Lift, Thinness, Two dimensional flow, Camber, Blade airfoils, Gust loads, Mathematical prediction, Vortices, Heterogeneity, Aerodynamics, Coefficients, Moments, Trailing edges, Mean, Potential flow, Transfer functions, Stagnation point

IDENTIFIERS: (U) Unsteady aerodynamics, Lifting airfoils, Fredholm integral equations, Sears lift, PEG1102F, WJAFOSR2307A4

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DTIC REPORT BIBLIOGRAPHY

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AD-A145 141 11/8 11/2 20/3

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM
THEORY

PARIS-8 UNIV (FRANCE)

(U) Almost Finite Expansions of Arbitrary Semigroups.

(U) Relationships between Electronic Structure and
Stability of Metallic Glasses.

84 53P

DESCRIPTIVE NOTE: Final scientific rept. 30 Sep 78-31 Dec
82.

PERSONAL AUTHORS: Birget, J. C. ; Rhodes, J. ;

CONTRACT NO. AFOSR-81-0238

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0721

MAY 84 45P

PERSONAL AUTHORS: Abeles, F. ; Theye, M. L. ; Van, V. N. ;

CONTRACT NO. AFOSR-78-3701

PROJECT NO. 2308

TASK NO. C3

MONITOR: AFOSR
TR-84-0708

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Pure and Applied
Algebra, v32 p239-287 1984.

Reprint: Almost Finite Expansions of Arbitrary Semigroups.

DESCRIPTORS: (U) *Groups(Mathematics), *Algebra,
Numerical methods and procedures, Expansion, Global,
Coordinates, Reprints

IDENTIFIERS: (U) *Semigroup theory, PE81102F,
WUAFOSR2304A8

UNCLASSIFIED REPORT

ABSTRACT: (U) Amorphous Au-Ge and Ag-Ge alloy films were
prepared by co-evaporation on low-temperature (15-20K)
substrates under ultra-high vacuum for Ge concentrations
between 20 and 40 at.%. Changes in short-range order have
been observed by room-temperature electron diffraction
experiments for Ge concentrations larger than 30 at.%.
The d.c. electrical resistivity and the optical
properties of the as-deposited amorphous metallic alloys
are examined in detail as a function of composition. The
Drude model with a constant relaxation time is found to
reproduce the low-energy optical data satisfactorily.

DESCRIPTORS: (U) *Alloys, *Amorphous materials, *Glass,
Electrical resistance, Optical properties, Relaxation
time, Optical data, Electron diffraction, Ultrahigh
vacuum, Atomic structure, Germanium, Films, Gold, Silver

IDENTIFIERS: (U) *Metallic glasses, Electronic structure,
PE81102F, WUAFOSR2308C3

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AD-A145 141

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A145 131 9/2

AD-A145 109 20/5

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS

(U) Assessing the Reliability of Computer Software and Computing Networks: An Opportunity for Partnership with Computer Scientists.

(U) Free Electron Lasers.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan-1 Dec 83,

DESCRIPTIVE NOTE: Technical rept.,

DEC 83 11P

JUL 84 11P

PERSONAL AUTHORS: Colson, W. B. ;

PERSONAL AUTHORS: Barlow, R. E. ; Singpurwalla, N. D. ;

REPORT NO. ORC-84-7

CONTRACT NO. F49620-83-C-0043

CONTRACT NO. N00014-77-C-0283, AFOSR-81-0122

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A5

TASK NO. A1

MONITOR: AFOSR
TR-84-0821

MONITOR: AFOSR
TR-84-0737

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with the George Washington Univ.

ABSTRACT: (U) Further support of the LANL experiment and the strong-field synchrotron instability has used the periodic window for optical mode analysis. Using the LANL parameters current and magnetic field strength, the effect of the resonator or mode stability was examined. It was found that as much as 20% loss/pass was necessary for the FEL to run without sidebands. When the losses were dropped to 14% pass, a single sideband appeared in the untapered FEL planned at LANL. When the losses were lowered to 1% (as eventually planned), the optical field vacame chaotic and the FEL went broad band. (Author)

ABSTRACT: (U) This paper highlights three areas which are of importance in computer science, and in which statisticians can make valuable contributions. The authors outline these areas, survey the developments, and point out some of the open problems. The research areas are: software reliability, the reliability of fault tolerant computers, and the reliability of computer networks.

DESCRIPTORS: (U) *Computer program reliability, *Fault tolerant computing, *Networks, Computations, Computers, Interfaces, Statistics, Personnel, Mathematical models, Probability, Statistical inference

DESCRIPTORS: (U) *Lasers, *Free electrons, Equations, Electron beams, Broadband, Sidebands, Magnetic fields, Field intensity, Windows, Bibliographies, Reports

IDENTIFIERS: (U) *Free electron lasers, PE61102F, WUAFOSR2301A1

IDENTIFIERS: (U) Statisticians, PE61102F, MUNRO42372, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A145 100 7/3

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

(U) The Octofluorocyclooctatetraene Radical Anion.
Identification and Proof of Aromaticity by Electron
Spin Resonance.

84 5P

PERSONAL AUTHORS: Walther, B. W. ; Williams, F. ; Lemal, D. M.

CONTRACT NO. AFOSR-83-0047

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0762

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical
Society, v106 n3 p548-551 1984.

Reprint: The Octofluorocyclooctatetraene Radical Anion.
Identification and Proof of Aromaticity by Electron Spin
Resonance.

DESCRIPTORS: (U) *Aromatic compounds, Anions, Electron
spin resonance, Irradiation, Synthesis (Chemistry),
Reprints

IDENTIFIERS: (U) Octofluorocyclooctatetraene anions,
WUAFORSR230382, PE61102F

AD-A145 100

UNCLASSIFIED

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AD-A145 099 7/3

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

(U) Perfluorotropilidene Valence Isomers and the
Perfluorotropylium Ion.

84 3P

PERSONAL AUTHORS: Dailey, W. P. ; Lemal, D. M. ;

CONTRACT NO. AFOSR-83-0047, NSF-CHE79-24309

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0784

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical
Society, v106 p1169-1170 1984.

Reprint: Perfluorotropilidene Valence Isomers and the
Perfluorotropylium Ion.

DESCRIPTORS: (U) *Isomers, Valence, Ions, Fluorine
compounds, Reprints

IDENTIFIERS: (U) *Tropilidene/perfluoro,
*Perfluorotropilidene, Fluorocarbons, Perfluorotropylium
ions, WUAFORSR230382, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A145 090

12/1 9/2

AD-A145 082

12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE STATISTICS CENTER

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM THEORY

(U) Numerical Algorithms and Parallel Tasking.

DESCRIPTIVE NOTE: Interim rept. 15 May 83-14 May 84,

JUL 84 5P

81 13P

PERSONAL AUTHORS: Kilema, V. ;

PERSONAL AUTHORS: Kalman, R. E. ;

CONTRACT NO. AFOSR-82-0210

CONTRACT NO. AFOSR-78-3034, DAAG29-77-G-0225

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A3

TASK NO. A8

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0744

TR-84-0741

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During this research period progress was made on the system integration of the software tasker to support algorithmic and applications segmentation for concurrent computing. This permits an efficient distribution of code and data on processing elements. The tasker provides primitives to support the segmenting of processes, monitors execution on worker processors by the manager on each concurrent system, and achieves asynchronous communication among worker processors and between the manager processor and the workers. (Author)

DESCRIPTORS: (U) *Algorithms, *Parallel processing, *Integrated systems, Computations, Dual mode, Asynchronous systems, Computer communications, Research management, Coding, Microprocessors, Signal processing, Image processing

IDENTIFIERS: (U) MIMD(Multiple Instruction Multiple Data) PE81102F, WUAFOSR2304A3

DESCRIPTORS: (U) *Sequences(Mathematics), *Covariance, Power series, Scalar functions, Entropy, Physicists, Coefficients, Polynomials, Parameters

IDENTIFIERS: (U) WUAFOSR2304A6, PE81102F

SUPPLEMENTARY NOTE: Presented at Toeplitz Memorial Conference, 12 May 81, Tel Aviv, Israel.

ABSTRACT: (U) This paper examines the problem of positivity in relation to the partial realization of scalar power series. An exact criterion of positivity is proved for second-order realizations. The general case is currently unsolved. Even the special results contained here show that the so-called maximum entropy principle cannot be applied to the realization problem in the naive sense in which it is employed by physicists. It would be better to call this principle a prejudice because it does not fully utilize the information inherent in the data and does not provide a realization with natural (minimal) mathematical properties. (Author)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A145 081 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) An Integral Inequality with Applications to Order Statistics.

DESCRIPTIVE NOTE: Technical rept.,

JUN 84 19P

PERSONAL AUTHORS: Boland, P. J. ; Proschan, F. ;

REPORT NO. FSU-STATISTICS-M681. TR-83-169-AFOSR

CONTRACT NO. F49620-82-K-0007

MONITOR: AFOSR
TR-84-0713

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with University Coll., Dublin. Dept. of Mathematics.

ABSTRACT: (U) Document discusses life distribution functions. Applications in reliability theory and order statistics are given.

DESCRIPTORS: (U) *Inequalities. *Integrals. *Order statistics. Distribution functions. Reliability. Theory. Random variables. Transformations(Mathematics). Functions(Mathematics)

IDENTIFIERS: (U) *Life distribution functions, WJAFOSR2304A5, PE61102F

AD-A145 080 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Testing Whether New is Better than Used of a Specified Age, with Randomly Censored Data.

DESCRIPTIVE NOTE: Technical rept.,

DEC 83 19P

PERSONAL AUTHORS: Hollander, M. ; Park, D. H. ; Proschan, F. ;

REPORT NO. FSU-STATISTICS-M669, TR-83-164-AFOSR

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0716

UNCLASSIFIED REPORT

ABSTRACT: (U) Using randomly censored data, the authors develop a test of the null hypothesis that a new item has stochastically the same residual life length as does a used item of specified age t sub 0, versus the alternative hypothesis that a new item has stochastically greater residual life length than does a used item of age t sub 0. They also compare our test with a related test, developed for a complete-data model, in order to study the loss in efficiency because of censoring. (Author)

DESCRIPTORS: (U) *Statistical tests. *Stochastic processes. *Probability distribution functions. Mathematical models. Survivability. Failure. Hypotheses. Random variables. Cancer. Patients

IDENTIFIERS: (U) Life distributions, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A145 058 7/5

AD-A145 050 13/13 11/2

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

S-CUBED LA JOLLA CA

(U) Photochemistry of Perfluoro-3-diazo-2-butanone,

83 3P

(U) Development of Advanced Constitutive Model for Reinforced Concrete.

PERSONAL AUTHORS: Laganis, E. D. ; Janik, D. S. ; Curphey, T. J. ; Lemal, D. M. ;

DESCRIPTIVE NOTE: Final rept. 1 Mar 81-29 Feb 84,

APR 84 177P

CONTRACT NO. AFOSR-83-0047

PERSONAL AUTHORS: Hegemier, G. A. ; Read, H. E. ; Murakami, H.

PROJECT NO. 2303

REPORT NO. SSS-R-84-8884

TASK NO. 82

CONTRACT NO. F49620-81-C-0033

MONITOR: AFOSR
TR-84-0763

PROJECT NO. 2307

UNCLASSIFIED REPORT

TASK NO. C2

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v105 n25 p7457-7459 1983.

MONITOR: AFOSR
TR-84-0750

Reprint: Photochemistry of Perfluoro-3-diazo-2-butanone.

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *Photochemical reactions, Butanones, Synthesis(Chemistry), Reprints

SUPPLEMENTARY NOTE: Prepared in cooperation with Defense Nuclear Agency, Contract DNA001-84-C-0127.

IDENTIFIERS: (U) Perfluoro-3-diazo-2-butanone, Oxirenes, PE81102F, WUAFOSR2303B2

ABSTRACT: (U) The objective of this research was to develop an advanced, nonlinear, multiaxial constitutive theory for reinforced concrete which provides a modeling capability that is superior to existing models, especially in the nonlinear response regime. The problem of constructing such a theory is partitioned into two major tasks, which have been pursued concurrently. One task consists of formulating a procedure (mixture theory) for analytically mixing reinforcing steel and plain concrete, so that the interaction between the two, which plays a key role in the overall behavior of reinforced concrete, is properly modeled. The other task consists of developing a model of plain concrete, which accurately portrays its nonlinear, multiaxial behavior and which is computationally feasible for use in conjunction with the mixture theory. The mixture theory is designed to synthesize the global constitutive properties of reinforced concrete from the properties of plain concrete, steel, interfaces and reinforcing geometry. The progress made during the course of the program toward achieving the above research objectives is summarized. A detailed

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account of the accomplishments made during the third year of the program are given, since these are not available elsewhere. Finally, a list of the publications and technical interactions which resulted from this research is given.

DESCRIPTORS: (U) *Reinforced concrete, Structural response, Concrete, Steel, Interactions, Mixtures, Theory, Rock, Soils, Strain(Mechanics), Modification, Stress waves

IDENTIFIERS: (U) *Strain softening, Constitutive models

AD-A145 045 9/2 12/1

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Set-Theoretic Problems of Null Completion in Relational Databases.

DESCRIPTIVE NOTE: Technical rept..

84 5P

PERSONAL AUTHORS: Keller, A. M. ;

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-84-0711

UNCLASSIFIED REPORT

ABSTRACT: (U) When considering using databases to represent incomplete information, the relationship between two facts where one may imply the other needs to be addressed. In relational databases, this question becomes whether null completion is assumed. That is, does a (possibly partially-defined) tuple imply the existence of tuples that are less informative than the original tuple. We show that no relational algebra, that assumes equivalence under null completion, can include set-theoretic operators that are compatible with ordinary set theory. (Author)

DESCRIPTORS: (U) *Data bases, *Set theory, Theorems, Integration, Models, Information systems

IDENTIFIERS: (U) *Null completion, PE81102F,
WUAFOSR2304A7

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

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AD-A145 040 20/4 20/13

FLORIDA UNIV GAINESVILLE

OKLAHOMA UNIV NORMAN SCHOOL OF AEROSPACE MECHANICAL AND
NUCLEAR ENGINEERING

(U) We Can Do Something about Multicollinearity,

84 14P

(U) Turbulent Boundary Layers Over Rough Surfaces
Hypersonic Flow.

PERSONAL AUTHORS: Kalman, R. E. ;

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 May 84,

CONTRACT NO. AFOSR-81-0238

JUN 84 43P

PROJECT NO. 2304

PERSONAL AUTHORS: Russell, J. M. ;

TASK NO. A8

CONTRACT NO. AFOSR-83-0186

MONITOR: AFOSR
TR-84-0722

PROJECT NO. 2307

TASK NO. D9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Commun. Statist.-Theor.
Method., v13 n2 p115-125 1984.

Reprint: We Can Do Something about Multicollinearity.

DESCRIPTORS: (U) *Mathematical models, *Information
theory, Confluence, Econometrics, Macroeconomics,
Economic analysis, France, United States,
Matrices(Mathematics), Reprints

IDENTIFIERS: (U) *Multicollinearity, Frisch scheme,
Noisy data, PE81102F, WJAFOSR2304A8

UNCLASSIFIED REPORT

ABSTRACT: (U) A method for predicting the downstream development of momentum thickness, skin friction, and heat transfer in a supersonic turbulent boundary layer over a rough flat plate based on ideas of Van Driest, Rotta, and Bradshaw is derived and discussed. Admissible thermal boundary conditions include the case of prescribed wall temperature and the case of an adiabatic wall. The velocity profiles for compressible nonadiabatic flow are expressed as transformations of the corresponding velocity profiles in incompressible adiabatic flow. Analytical curve fits to the experimentally determined law-of-the-wall (including the sublayer region) are given, as are analytical representations of the effects of sand grain roughness based on the well known data of Nikuradse. A FORTRAN source code for implementing the method is included as are sample calculations of the momentum thickness, skin friction, and heat transfer for several roughness heights. (Author)

DESCRIPTORS: (U) *Turbulent boundary layer, *Hypersonic flow, *Surface roughness, Height, Momentum, Thickness, Skin friction, walls, Adiabatic conditions, Aerothermodynamics, FORTRAN, Mathematical prediction, Computer programs, Algorithms, Compressible flow, Transformations(Mathematics), Incompressible flow,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A145 040 CONTINUED

Velocity, Profiles, Curve fitting, Sand

IDENTIFIERS: (U) Law of the wall, Rotta energy equation,
Van Driest transformation theory, PE61102F, WUAFOSR2307D9

AD-A145 016 9/2

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) A Reasonable View Update Translator that Preserves No
Complement.

DESCRIPTIVE NOTE: Technical rept.,

84 3P

PERSONAL AUTHORS: Keller, A. M. ;

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-84-0709

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *Translators, Data bases, User needs,
Access

IDENTIFIERS: (U) Relational data bases, PE61102F,
WUAFOSR2304A7

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AD-A145 016

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A145 014 12/1

AD-A145 012 7/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Uniform Consistency of a Class of Regression Function Estimators.

(U) Hexamethylsilirane. 8. Conversion to 1-Oxa-2-Silacyclopentanes by 'Two-Atom' Insertion Reactions of Aldehydes and Ketones.

84 13P

84 8P

PERSONAL AUTHORS: Hardle, W. ; Luckhaus, S. ;

PERSONAL AUTHORS: Seyferth, D. ; Duncan, D. P. ; Shannon, M. L.

CONTRACT NO. F49620-82-C-0008

PROJECT NO. 2304

CONTRACT NO. AFOSR-83-0003

TASK NO. A5

PROJECT NO. 2303

MONITOR: AFOSR
TR-84-0731

MONITOR: AFOSR
TR-84-0785

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Statistics, v12
n2 p612-623 1984.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallics, v3
n4 p579-583 1984.

Reprint: Uniform Consistency of a Class of Regression Function Estimators.

Reprint: Hexamethylsilirane. 8. Conversion to 1-Oxa-2-Silacyclopentanes by 'Two-Atom' Insertion Reactions of Aldehydes and Ketones.

DESCRIPTORS: (U) *Regression analysis,
*Functions(Mathematics), *Estimates, Nonparametric
statistics, Stochastic processes, Consistency, Kernel
functions, Bandwidth, Reprints

DESCRIPTORS: (U) *Silicon compounds, Cyclic compounds,
Aldehydes, Ketones, Reprints

IDENTIFIERS: (U) PE61102F

IDENTIFIERS: (U) *Siliranes/Hexamethyl, Insertion
reactions, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A145 011

7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Hexamethylsilirane. IV. Nucleophilic Ring Opening by Alkylolithium Reagents.

84

6P

PERSONAL AUTHORS: Seyferth, D. ; Wiseman, G. H. ; Annarelli, D. C. ; Shannon, M. L. ;

CONTRACT NO. AFOSR-83-0003

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-84-0786

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v284 p149-153 1984.

Reprint: Hexamethylsilirane. IV. Nucleophilic Ring Opening by Alkylolithium Reagents.

DESCRIPTORS: (U) *Grignard reactions, *Lithium compounds, Reprints, Organometallic compounds

IDENTIFIERS: (U) *Siliranes/Hexamethyl, Nucleophilic reactions, Ring openings, PE81102F

AD-A145 009 3/2 20/9

CALIFORNIA UNIV SAN DIEGO LA JOLLA CENTER FOR ASTROPHYSICS AND SPACE SCIENCES

(U) Studies of Solar Flares and Coronal Loops.

DESCRIPTIVE NOTE: Final scientific rept. 1 Feb 82-31 May 84,

JUL 84 241P

PERSONAL AUTHORS: Canfield, R. C. ;

REPORT NO. UCSD-SP-84-21

CONTRACT NO. AFOSR-82-0092

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0719

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this research were to improve our understanding of solar flares and solar flares and solar coronal loops. The specific approach to the flare objective was to analyze and interpret solar flare data, using theoretical methods developed as part of the research. The specific approach to the coronal loop objective was to investigate their thermal and magnetohydrodynamic stability for various physical models. The principal result of the flare research was to demonstrate that, in two well-observed flares, the mechanism of chromospheric evaporation accounts for the observed amount of flare X-ray plasma. The dominant energy transport mechanism is thermal conduction. Heating by energetic electrons is of secondary importance. The principal results of the magnetohydrodynamic stability analyses were demonstrations of the role of radiative energy loss, compressibility, magnetic field line twist, foot-point magnetic field line tying, and radial plasma pressure gradient.

DESCRIPTORS: (U) *Chromosphere, *Solar flares, *Solar corona, Radiative transfer, Loops, Thermal stability, Magnetohydrodynamics, Stability, Models, Thermal conductivity, Solar x rays, Heating, Evaporation,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A145 009 CONTINUED

Plasmas(Physics), Pressure gradients, Energy transfer,
Electrons, Magnetic fields, Twist(Motion)

IDENTIFIERS: (U) Coronal loops, PEB1102F, WUAFOSR2311A1

AD-A144 998 12/1

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

(U) Credibility Approximations for Bayesian Prediction of
Second Moments.

DESCRIPTIVE NOTE: Technical rept.,

MAR 84 44P

PERSONAL AUTHORS: Jewell, W. S. ; Schnieper, R. ;

REPORT NO. ORC-84-3

CONTRACT NO. AFOSR-81-0122

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0820

UNCLASSIFIED REPORT

ABSTRACT: (U) Credibility theory refers to the use of linear least-squares theory to approximate the Bayesian forecast of the mean of a future observation; families are known where the credibility formula is exact Bayesian. Second-moment forecasts are also of interest, for example, in assessing the precision of the mean estimate. For some of these same families, the second-moment forecast is exact in linear and quadratic functions of the sample mean. On the other hand, for the normal distribution with normal-gamma prior on the mean and variance, the exact forecast of the variance is a linear function of the sample variance and the squared deviation of the sample mean from the prior mean. Buhlmann has given a credibility approximation to the variance in terms of the sample mean and sample variance. This paper presents a unified approach to estimating both first and second moments of future observations using linear functions of the sample mean and two sample second moments; the resulting least-squares analysis requires the solution of a 3 x 3 linear system, using 11 prior moments from the collective and giving joint predictions of all moments of interest. Previously developed special class follow immediately. For many analytic models of interest, one can replace the 3-dimensional joint prediction with three independent credibility forecasts using the natural

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

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AD-A144 987 12/1

statistics for each moment. (Author)

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

DESCRIPTORS: (U) *Mathematical prediction, *Bayes theorem, *Forecasting, *Least squares method, Variations, Linear systems, Computations, Approximation(Mathematics), Mathematical models, Formulas(Mathematics), Moments, Matrices(Mathematics), Observation, Estimates

(U) Power Transformations When Fitting Theoretical Models to Data,

JUN 84 9P

PERSONAL AUTHORS: Carroll, R. J. ; Ruppert, D. ;

IDENTIFIERS: (U) *Credibility theory, PE61102E

CONTRACT NO. F49620-82-C-0009, NSF-MCS81-00748

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Statistical Association, v79 n386 p321-328 Jun 84.

Reprint: Power Transformations When Fitting Theoretical Models to Data.

DESCRIPTORS: (U) *Transformations(Mathematics), *Nonlinear analysis, *Regression analysis, Mathematical models, Asymptotic normality, Monte Carlo method, Reprints

IDENTIFIERS: (U) Power transformations, *Nonlinear regression analysis, PE61102F, WUAFOSR2304A5

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AD-A144 987

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLOBF

AD-A144 979 12/1

AD-A144 972 6/2 15/2

WASHINGTON STATE UNIV PULLMAN DEPT OF PURE AND APPLIED MATHEMATICS

VANDERBILT UNIV NASHVILLE TN DEPT OF PHARMACOLOGY

(U) Stationarity and Superlinear Convergence of an Algorithm for Univariate Locally Lipschitz Constrained Minimization.

(U) Nerve Agent Toxicity and Its Prevention at the Neuromuscular Junction; an Analysis of Acute and Delayed Toxic Effects in Extraocular and Skeletal Muscle.

84 24P

DESCRIPTIVE NOTE: Final technical rept. 15 Sep 82-31 Mar 84,

PERSONAL AUTHORS: Mifflin, R. ;

CONTRACT NO. AFOSR-83-0210

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-84-0742

MAY 84 17P

PERSONAL AUTHORS: Dettbarn, W. D. ;

CONTRACT NO. AFOSR-82-0310

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR
TR-84-0748

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming, v28 p50-71 1984.

UNCLASSIFIED REPORT

Reprint: Stationarity and Superlinear Convergence of an Algorithm for Univariate Locally Lipschitz Constrained Minimization.

ABSTRACT: (U) The nerve agent soman (0.080 mg/kg s.c.), as well as other organophosphates in concentrations that cause cholinergic symptoms, DFP (1.5 mg/kg s.c.), paraoxon (0.23 mg/kg s.c.), and tertiary (0.2 mg s.c.) and quaternary phospholine (0.080 mg/kg s.c.) induced a progressive, dose-related necrosis in rat skeletal muscle fiber. The severity of the myopathy depended on a critical decrease and duration of AChE inhibition. The fast type II fibers appeared to be the more affected fibers in all muscles tested. The necrotic nerve fibers were repaired within one week. Examination of muscle fibers 2 and 3 weeks after a single injection of soman showed a large number of ragged red fibers in the diaphragm and soleus muscle. Following AChE inhibition, the 4S molecular form of AChE showed the fastest recovery as compared with the 10S, 12S and 16S forms. The half-time recovery rate of AChE after inhibition depended on the inhibitor used and the tissue investigated. In general, half-time rate of recovery was slowest in brain and nerve and fastest in SOL and EDL muscle. AChE activity of peripheral nerve was barely inhibited by soman and had recovered to control activity within 24 hours.

DESCRIPTORS: (U) *Algorithms, *Functions(Mathematics), *Convergence, Mathematical programming, Optimization, Problem solving, Reprints

IDENTIFIERS: (U) Locally Lipschitz functions, PE61102F, WJAFOSR2304A1

DESCRIPTORS: (U) *Toxicity, *Nerve agents, *GD agent,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 972 CONTINUED

AD-A144 989 12/1 9/3

*Acetylcholinesterase, Inhibition, Neuromuscular transmission, Recovery, Activation, Junctions, Muscles, Muscle fibers, Rats, Cholinesterase inhibitors

SCIENTIFIC RESEARCH ASSOCIATES INC GLASTONBURY CT
(U) Solution of the Boltzmann Transport Equations for a Permeable Base Transistor.

IDENTIFIERS: (U) PE81102F, WUAFOSR2312A3

DESCRIPTIVE NOTE: Final rept. 17 Oct 83-31 May 84,

JUL 84 37P

PERSONAL AUTHORS: Buggein, R. C. ; Kreskovsky, J. P. ; Grubin, H. L. ;

REPORT NO. SRA-R84-910005-F

CONTRACT NO. F49620-83-C-0157

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR
TR-84-0707

UNCLASSIFIED REPORT

ABSTRACT: (U) A description of a numerical method for solving the Boltzmann transport equations is presented. This numerical technique is applied to the case of the solution of the Boltzmann equations for a gallium arsenide permeable base transistor. Calculated results are presented for two base potentials. (Author)

DESCRIPTORS: (U) *Numerical methods and procedures, *Boltzmann equation, *Solutions(General), Transistors, Permeability, Gallium arsenides, Diffusion, Transport properties, Drift, Electrical properties, Charts, Algorithms

IDENTIFIERS: (U) Transport equations, PE81102F, WUAFOSR3005A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 988 12/1

AD-A144 943 7/3

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Marginal Values and Second-Order Necessary Conditions for Optimality.

(U) Hexamethylsilirane. 5. Conversion to Five-Membered Ring Silicon Compounds by 'Two-Atom' Insertion Reactions of Aryl Olefins, 1,3-Dienes, and Conjugated Acetylenes.

83 43P

PERSONAL AUTHORS: Rockafellar, R. T. ;

84 8P

CONTRACT NO. F49620-82-K-0012

PERSONAL AUTHORS: Seyferth, D. ; Duncan, D. P. ; Shannon, M. L. ; Goldman, E. W. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-83-0003

TASK NO. A8

PROJECT NO. 2303

MONITOR: AFOSR

TR-84-0732

TASK NO. B2

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-84-0787

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming, v26 p245-286 1983.

UNCLASSIFIED REPORT

Reprint: Marginal Values and Second-Order Necessary Conditions for Optimality.

SUPPLEMENTARY NOTE: Pub. in Organometallics, v3 n4 p574-578 1984.

DESCRIPTORS: (U) *Nonlinear programming, Methodology, Optimization, Parametric analysis, Value, Lagrangian functions, Reprints

Reprint: Hexamethylsilirane. 5. Conversion to Five-Membered Ring Silicon Compounds by 'Two-Atom' Insertion Reactions of Aryl Olefins, 1,3-Dienes, and Conjugated Acetylenes.

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A8

DESCRIPTORS: (U) *Silicon compounds, Unsaturated hydrocarbons, Chemical reactions, Reprints

IDENTIFIERS: (U) *Silirane/hexamethyl, *Insertion reactions, Ring compounds, WUAFOSR2303B2, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 942 12/1 20/9

AD-A144 941 8/15

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF
MATHEMATICS

LOS ALAMOS NATIONAL LAB NM

(U) Exact Results for the Two-Dimensional Two-Component
Plasma,

(U) Performance Enhancement.

DESCRIPTIVE NOTE: Final rept.,

JUN 84 5P

MAR 84 13P

PERSONAL AUTHORS: Nicolaidis, D. ;

PERSONAL AUTHORS: George, J. S. ; Bitensky, M. W. ;

CONTRACT NO. AFOSR-82-0016

CONTRACT NO. AFOSR-MIPR-82-00064

PROJECT NO. 2301

PROJECT NO. 2312

TASK NO. A8

TASK NO. A1

MONITOR: AFOSR
TR-84-0740

MONITOR: AFOSR
TR-84-0749

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physics Letters. v103A n1,2
p64-66, 18 Jun 84.

Reprint: Exact Results for the Two-Dimensional Two-
Component Plasma.

DESCRIPTORS: (U) *Computations, *Plasmas(Physics), Free
energy, Correlation techniques, Two dimensional,
Temperature

IDENTIFIERS: (U) Reprints. WUAFOSR2301A8, PEB1102F

ABSTRACT: (U) Work thus far has focused on a class of
tricyclic antidepressants (TADS) whose action has a
gradual onset associated with the metabolic response to
the drugs. Chronic treatment of rats with TADS sensitized
synaptosomal adenylate cyclase (AC) to activation with
guanyl nucleotides. The research has attempted to
describe anatomical and functional localization of the
response, probe the biochemical mechanism of observed
effects; and look for behavioral correlates of
biochemical changes. An interesting finding is that
unlike the hypothalamic or cortical enzyme, enzyme,
cerebellar synaptosomal AC is not sensitized to
nucleotide activation. Other TAD associated changes are
seen in cerebellum. A number of plausible biochemical
mechanisms for the observed TAD responses have been
investigated, and several additional possibilities have
been identified. The precise mechanisms involved remains
unclear. Several behavioral tests were employed to
attempt to quantify observed behavioral differences
between control and TAD-treated animals. The most
significant observed differences was in the range and
variance of responses between groups. More sophisticated
and sensitive experimental paradigms are being developed.

DESCRIPTORS: (U) *Drugs, Behavior, Metabolism,
Response(Biology), Rats, Activation, Nucleotides,
Biochemistry, Hypothalamus

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 940 12/1

IDENTIFIERS: (U) *Antidepressants, WUAFOSR2312A1,
PE61102F

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

(U) Simulation Uses of the Exponential Distribution.

DESCRIPTIVE NOTE: Technical rept.,

JUN 84 22P

PERSONAL AUTHORS: Ross, S. M.; Schechner, Z. ;

REPORT NO. ORC-84-6

CONTRACT NO. AFOSR-81-0122

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0819

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper indicates how exponential random variables can be efficiently used in a variety of simulation problems. One of the problems is the simulation of order statistics from a normal population. The authors discuss the general problem of simulating order statistics and then consider the normal case. They start by showing how the Von-Neumann rejection approach via the exponential can be modified to become an efficient algorithm for generating a normal and then present a method for generating normal order statistics. They show how to use the exponential to efficiently simulate random permutations with weights. They consider the problem of simulating a 2-dimensional Poisson process both for a homogeneous and nonhomogeneous Poisson process. (Author)

DESCRIPTORS: (U) *Exponential functions, *Distribution functions, *Random variables, *Simulation, Order statistics, Algorithms, Two dimensional, Homogeneity, Poisson equation, Permutations

IDENTIFIERS: (U) Von Neumann rejection technique,
*Exponential distribution, PE61102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 937 9/2 12/1

AD-A144 934 3/2 20/6 14/5

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

ROCHESTER UNIV NY

(U) Updating Logical Databases.

(U) Laser Speckle and Related Phenomena.

DESCRIPTIVE NOTE: Technical rept.,

84 89P

84 15P

PERSONAL AUTHORS: Dainty, J. C. ;

PERSONAL AUTHORS: Fagin, R. ; Kuper, G. M. ; Ullman, J. ; Vardi, M. Y. ;

CONTRACT NO. AFOSR-81-0003

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2311

PROJECT NO. 2304

TASK NO. A1

TASK NO. A7

MONITOR: AFOSR
TR-84-0848

MONITOR: AFOSR
TR-84-0712

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with IBM Research Lab., Jan Jose, CA.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with IBM Research Lab., Jan Jose, CA.

Reprint: Laser Speckle and Related Phenomena.

ABSTRACT: (U) The authors suggest a new approach to database updates, in which a database is treated as a collection of theories. They investigate two issues: simultaneous multiple update operations, and equivalence of databases under update operations. (Author)

DESCRIPTORS: (U) *Astronomical bodies, *Interferometry, Signal to noise ratio, Photographic images, Resolution, Diffraction, Mathematical models, Algorithms, Bibliographies, Reprints

IDENTIFIERS: (U) Stellar interferometry, *Speckle interferometry, WJAFOSR2311A1, PE81102F

DESCRIPTORS: (U) *Data bases, *Theory, Logic, Multiple operation, Semantics

IDENTIFIERS: (U) Update operation, Flock, WJAFOSR2304A7, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 845 12/1

AD-A144 756 12/1 20/B

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

(U) Some Weak and Strong Laws of Large Numbers for $D(0,1)$ - Valued Random Variables.

(U) Shift-Variant Multidimensional Systems.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Jan 84,

JUL 84 45P

MAR 84 80P

PERSONAL AUTHORS: Wang, X. C.; Rao, M. B.;

PERSONAL AUTHORS: Boss, N. K.;

REPORT NO. TR-84-36

CONTRACT NO. AFOSR-83-0038

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A8

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0714

TR-84-0889

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Pointwise Weak Law of Large Numbers and Weak Law of Large Numbers in the norm topology of $D(0,1)$ are shown to be equivalent under uniform convex tightness and uniform integrability conditions for weighted sums of a sequence of random elements in $D(0,1)$. Uniform convex tightness and uniform integrability conditions are jointly characterized. Marcinkiewicz-Zygmund-Kolmogorov's and Brunk-Chung's Strong Laws of Large Numbers are derived in the setting of $D(0,1)$ - space under uniform convex tightness and uniform integrability conditions. Equivalence of pointwise convergence, convergence in the Skorokhod topology and convergence in the norm topology for sequences in $D(0,1)$ is studied. (Author)

DESCRIPTORS: (U) *Random variables, *Numbers, *Convergence, Topology, Banach space, Convex bodies, Tightness, Stochastic processes, Theorems

***** (U) WUAFOSR2304A5, PEB1102F

ABSTRACT: (U) To a great extent the techniques for analysis and restoration of images has been developed under the assumption that the system is linear shift-invariant (LSI). These techniques are successful in some cases because a system which is diffraction-limited or a system whose object plane undergoes uniform linear motion perpendicular to the system reference axis does indeed satisfy these assumptions. However, LSI systems are singled out for study mainly because of the widespread understanding of the Fourier Transform theory along with well-known fast algorithms for its implementation. In comparison with LSI systems, very little work has been done on linear shift-variant (LSV) systems. Most of the research on two dimensional LSV systems has been done on restoration techniques by means of coordinate transformations. This technique decomposes the LSV system into a distortion of the input plane followed by a shift-invariant operation and terminated by a distortion of the output plane. The primary objective of this research is to provide not only a mathematical structure for the state-space modeling of discrete LSV systems but to apply this model to the problems of efficient analysis and deconvolution of multidimensional systems.

DESCRIPTORS: (U) *Mathematical models, *Image restoration, Fourier transformation, Theory, Coordinates, Transformations(Mathematics), Two dimensional, Linearity, Degradation, Distortion, Air Force research

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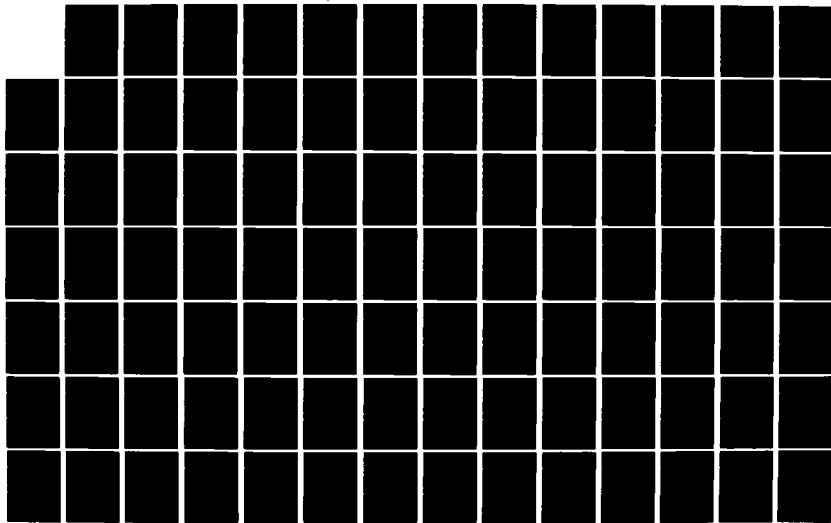
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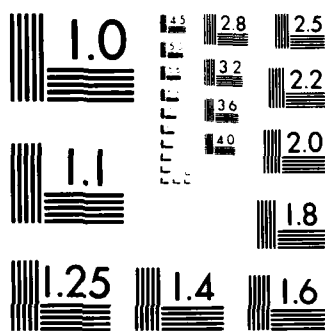
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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO6F

AD-A144 758 CONTINUED

AD-A144 754 7/5

IDENTIFIERS: (U) Linear shift variant systems,
Multidimensional systems, Image understanding, PE61102F,
WUAFOSR2304A8

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Organic Photochemical Mechanisms.

84 5P

PERSONAL AUTHORS: TURRO, N. J. ;

CONTRACT NO. AFOSR-81-0013

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0860

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Photochemistry, v25
n69 p69-72 1984.

Reprint: Organic Photochemical Mechanisms.

DESCRIPTORS: (U) *Photochemical reactions, *Organic
compounds, *Reaction kinetics, Instrumentation, Solvents,
Homogeneity, History

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOS

AD-A144 707 7/3

AD-A144 671 12/1

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF MATHEMATICS

(U) Ligand (Adsorbate) Substitutions at Metal Surfaces:
Aromatic Compounds and Halides at Smooth
Polycrystalline Platinum Electrodes.

(U) Analysis and Regulation of Nonlinear and Generalized
Linear Systems.

DEC 83 6P

DESCRIPTIVE NOTE: Interim rept. 15 Jun 83-14 Jun 84.

PERSONAL AUTHORS: Sorlag, M. P. ; White, J. H. ; Song, D. ;
Hubbard, A. T. ;

JUL 84 10P

CONTRACT NO. AFOSR-81-0149

PERSONAL AUTHORS: Sontag, E. D. ;

PROJECT NO. 2303

CONTRACT NO. F49820-79-C-0117, AFOSR-80-0198

TASK NO. A1

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A6

TR-84-0684

MONITOR: AFOSR

TR-84-0694

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry,
v88 n11 p2284-2287, 27 Dec 83.

Reprint: Ligand (Adsorbate) Substitutions at Metal
Surfaces: Aromatic Compounds and Halides at Smooth
Polycrystalline Platinum Electrodes.

DESCRIPTORS: (U) *Substitution reactions, *Surface
reactions, *Platinum, Adsorption, Ligands, Halides,
Aromatic compounds, Reprints

IDENTIFIERS: (U) PE61102F, WJAFOSR2303A1

UNCLASSIFIED REPORT

ABSTRACT: (U) This work emphasizes research on discrete-
time nonlinear system theory as well as algebraic methods
in the analysis of generalized classes of linear systems.
(Author)

DESCRIPTORS: (U) *Nonlinear systems, *Linear systems,
*Nonlinear analysis, Control, Parameters, Dynamics,
Differential equations

IDENTIFIERS: (U) Linear analysis, WJAFOSR2304A6,
PE61102F

AD-A144 707

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 658 12/1

AD-A144 658 20/5 13/8

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

BATTELLE COLUMBUS LABS OH

(U) Tests for Sphericity under Correlated Multivariate Regression Equations Model.

(U) Three-Dimensional Photochemical Machining with Lasers.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Semi-Annual technical rept. no. 2, 1 Aug 83-31 Jan 84,

JUL 84 33P

MAY 84 22P

PERSONAL AUTHORS: Sarkar, S.; Krishnaiah, P. R.;

PERSONAL AUTHORS: Schwerzel, R. E.;

REPORT NO. TR-84-37

CONTRACT NO. F49620-82-C-0077, ARPA Order-4522

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR

TR-84-0886

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report, the authors considered some tests for sphericity of the error covariance matrix under a correlated multivariate regression equations model. Asymptotic distributions of the test statistics associated with the above procedures are also derived. (Author)

DESCRIPTORS: (U) *Mathematical models, Spheres, Multivariate analysis, Regression analysis

IDENTIFIERS: (U) Sphericity, PE81102F, WJAFOSR2304A5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Annual technical rept. no. 1, AD-A143 928.

ABSTRACT: (U) Research on new photoinitiator systems and improved photopolymers for photochemical machining with lasers has resulted in the successful laboratory demonstration of crossed-beam polymerization, although some single-beam polymerization still occurs under the condition examined to date. Porphyrin sensitizers and acrylate polymers have given the best results so far, especially when the samples are first degassed under vacuum to remove oxygen. A computer-controlled three-axis translation stage has been constructed to move the sample relative to the (fixed) laser beams. Future work will be directed toward continued improvement of the polymer materials. (Author)

DESCRIPTORS: (U) *Photochemical reactions, *Machining, *Lasers, Polyacrylates, Laser beams, Three dimensional, Polymerization, Demonstrations, Cross beam devices, Sensitizing, Porphyrins

IDENTIFIERS: (U) Photoinitiator systems, PE81102F

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AD-A144 658

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 635 7/5

AD-A144 617 5/10

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

GEORGIA INST OF TECH ATLANTA SCHOOL OF PSYCHOLOGY

(U) Electron-Transfer Quenching of Ruthenium(II)
Photosensitizers by Mercury(II) in Aqueous Nitrate
Media.

(U) Estimating the Number and Duration of Cognitive
Processes Using the within-Task Subtractive Method.

DESCRIPTIVE NOTE: Final technical rept. 15 Apr 83-14 Apr
84.

84 7P

PERSONAL AUTHORS: Hauenstein, B. L., Jr.; Dressick, W. J.;
Demas, J. N.; DeGraff, B. A.;

JUN 84 63P

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-06279

PERSONAL AUTHORS: Corso, G. M.; Patterson, M. J.;

CONTRACT NO. AFOSR-83-0088

PROJECT NO. 2303

PROJECT NO. 2313

TASK NO. B2

TASK NO. D8

MONITOR: AFOSR
TR-84-0683

MONITOR: AFOSR
TR-84-0698

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry,
v88 n11 p2418-2422 1984.

Reprint: Electron-Transfer Quenching of Ruthenium(II)
Photosensitizers by Mercury(II) in Aqueous Nitrate Media.

ABSTRACT: (U) This research was directed towards
developing a methodology for partitioning choice-reaction
time into component parts, using both the additive-factor
and the subtractive method. This methodology involved the
use of a modified Sternberg task in which the subjects
viewed two horizontally presented letters and were
required to classify each of the letters into either the
positive or negative set. The classification procedure
was performed by depressing two response keys on the same
trial. Latency measures were obtained for the elapsed
time between stimulus onset and the first response and
between the first response and the second response. Input
and output times were then derived. In addition, three
different types of interruption stimuli (auditory, visual
and auditory-visual) were presented at various times
prior to and after the onset of the classification
stimulus. Input and output latencies were differentially
influenced by the different types of interruption stimuli
and by the onset time of those interruption stimuli.

DESCRIPTORS: (U) *Photosensitivity, *Electron transfer,
Quenching, Ruthenium, Mercury, Nitrates, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B2

DESCRIPTORS: (U) *Interruption, *Test
construction(Psychology), *Cognition, *Reaction time,
Classification, Stimuli, Time, Parts, Performance(Human),
Decision making, Reaction(Psychology), Addition, Factor
analysis, Test methods, Classification, Visual signals,
Acoustic signals, Delay

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 615 12/1

IDENTIFIERS: (U) Task analysis, Choice reaction time,
Sternberg tasks, Latencies, WUAFOSR2313D9, PE81102F

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL
SYSTEMS

(U) Approximation of Feedback Controls for Parabolic
Systems.

83 5P

PERSONAL AUTHORS: Banks, H. T. ; Kunisch, K. ;

CONTRACT NO. DAAG29-79-C-0161, AFOSR-81-0198

MONITOR: AFOSR
TR-84-0295

UNCLASSIFIED REPORT

Availability: Pub. in IEEE, p247-251 1983 (No copies
furnished by DTIC/NTIS).

Reprint: Approximation of Feedback Controls for Parabolic
Systems.

DESCRIPTORS: (U) *Riccati equation,
*Operators(Mathematics), Feedback, Control, Computations,
Approximation(Mathematics), Hilbert space, Partial
differential equations, Reprints

IDENTIFIERS: (U) *Parabolic systems

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOS

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AD-A144 810 CONTINUED

WEIDLINGER ASSOCIATES MENLO PARK CA

arithmetic.

(U) Large-Scale Numerical Analysis of Three-Dimensional Seismic Waves.

DESCRIPTORS: (U) *Seismic waves, *Basins(Geographic), Mountains, Three dimensional, Mathematical models, Time domain, Finite element analysis, Computerized simulation, Algorithms, Earth crust

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 83.

MAY 84 53P

IDENTIFIERS: (U) Wave fields, CRAY-1 computers, WUAFOSR2308A1, PE81102F

PERSONAL AUTHORS: Wojcik, G. L.; Vaughan, D. K.;

REPORT NO. R-8403

CONTRACT NO. F49620-82-C-0002

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-84-0891

UNCLASSIFIED REPORT

ABSTRACT: (U) This report concludes our study of large-scale vectorized numerical analysis applied to time domain seismic wave phenomena in filled basins. Applications include calculations of waves from simple surface or buried sources in a variety of idealized 2-D Basin and Range models (36,000 to 120,000 nodes) described in an interim report, and one large 3-D model (400,000 nodes) from Yucca Flat, Nevada Test Site, described here. Analysis is based on an explicit, finite element, elastic wave solver designed for vectorized execution on the CRAY-1. The primary result of the present 3-D study is that, given the database available from investigations in Yucca Flat, Nevada Test Site, the size of feasible 3-D computational models on the CRAY-1S is adequate to simulate elastic wave fields and interpret arrivals for comparison with existing 3-D ground motion data. Synthetic seismograms from a 400,000 element 3-D simulation of the COALORA event at Yucca Flat indicate that a significant source of transverse motion on radial lines through the source is diffraction from a discontinuity in the Rainier Mesa tuff layer across the Yucca fault. Successful time-domain simulations in 3-D are feasible with pipelined supercomputers but optimal processing requires careful tailoring of the algorithm to vectorize inner code loops and eliminate nonessential

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 600 9/2

ARIZONA UNIV TUCSON ENGINEERING EXPERIMENT STATION

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Analytic Solution of the Spencer-Lewis Angular-Spatial Moments Equations.

(U) An Axes-Drawing Program for the Hewlett Packard Digital Plotters,

DESCRIPTIVE NOTE: Final rept. 1 Jun 83-31 May 84,

JUL 83 2P

JUL 84 53P

PERSONAL AUTHORS: Fillipone, W. L. ; Demas, J. N. ;

PERSONAL AUTHORS: Fillipone, W. L. ;

CONTRACT NO. AFOSR-78-3590

CONTRACT NO. AFOSR-83-0174

PROJECT NO. 2303

PROJECT NO. 2301

TASK NO. B2

TASK NO. D9

MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0897

TR-84-0880

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) An exact solution for the angular-spatial moments of the Spencer-Lewis equation is given, along with methods for reconstructing the electron density function. The new solution techniques is implemented in a computer code and several sample calculations are carried out with monoenergetic plane sources of electrons in infinite media of aluminum and carbon. The sample calculations produce the electron distribution in space and path length rather than some integrated quantity such as the energy deposition profile. Such analytic solutions are intended to serve as benchmarks for testing numerical electron transport codes. (Author)

DESCRIPTORS: (U) *Moments, *Electron transport, Mathematical analysis, Electron density, Normal density functions, Numerical methods and procedures, Computer programs, Electrons, Distribution, Aluminum, Media, Paths, Length

IDENTIFIERS: (U) *Angular spatial moments, *Spencer Lewis equation, WJAFOSR2301D9, PEB1102F

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Education, v80 n7 p588-589 Jul 83.

Reprint: An Axes-Drawing Program for the Hewlett Packard Digital Plotters.

DESCRIPTORS: (U) *Computer programming, *Plotters, *Computers, Symbolic programming, High level languages, Axes, Labels, Reprints

IDENTIFIERS: (U) Hewlett Packard Digital Plotter, AXES program, PEB1102F, WJAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 594 20/4 9/2 12/1

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

SCIENTIFIC RESEARCH ASSOCIATES INC GLASTONBURY CT

(U) Evidence for Chemisorption Site Selection Based on an Electron-Donor Mechanism.

(U) Development of a Design-Oriented Navier-Stokes Cascade Analysis.

MAY 84 7P

DESCRIPTIVE NOTE: Final rept. Sep 83-Mar 84.

PERSONAL AUTHORS: Klauber, C. ; Alvey, M. D. ; Yates, J. T. , Jr. ;

JUN 84 45P

PERSONAL AUTHORS: Shamroth, S. J. ; McDonald, M. ;

CONTRACT NO. AFOSR-82-0133

REPORT NO. SRA-910008F

PROJECT NO. 2303

CONTRACT NO. F33615-83-C-2370

TASK NO. A2

PROJECT NO. 3005

MONITOR: AFOSR
TR-84-0874

TASK NO. 20

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-84-2038

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v108 n5 p477-481, 4 May 84.

UNCLASSIFIED REPORT

Reprint: Evidence for Chemisorption Site Selection Based on an Electron-Donor Mechanism.

ABSTRACT: (U) Under a Phase I SBIR effort, an existing Navier-Stokes cascade computer code has been automated and recoded to form a design oriented cascade calculation procedure. The procedure consists of two distinct codes which are (1) the coordinate generation code and (2) the Navier-Stokes solver. With the revised procedure, the coordinate generator allows a new user to obtain coordinate systems with a minimum of input data. The Navier-Stokes procedure has been recoded to minimize required input and to decrease run time per time step. In addition, a run protocol has been developed to obtain rapid convergence. A demonstration calculation has been run which yields a converged solution in less than 300 CPU secs of unvectorized CRAY-1 run time. (Author)

DESCRIPTORS: (U) *Chemisorption, *Site selection, *Electron donors, Nickel, Clustering, Theory, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303A2

DESCRIPTORS: (U) *Cascades (Fluid dynamics), *Computer aided design, *Three dimensional flow, Navier stokes equations, Input, Data processing, Flow fields, Turbine blades

IDENTIFIERS: (U) WUAFWAL30052005, PEB5502F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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HONEYWELL SYSTEMS AND RESEARCH CENTER MINNEAPOLIS MN

IDENTIFIERS: (U) *Image understanding, Scene analysis,
Attributed graphs, WUAFOSR2304A7, PE61102F

(U) Hierarchical Multisensor Image Understanding.

DESCRIPTIVE NOTE: Annual rept. Oct 83-Sep 84, Interim
rept. 1 Jul 83-30 Jun 84,

JUL 84 68P

PERSONAL AUTHORS: Aggarwal, R. K. ;

CONTRACT NO. F49620-83-C-0134

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-84-0639

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All
DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) This report describes the research results
on Honeywell's Hierarchical Multisensor Image
Understanding program. Honeywell is developing a unified
framework for the different hierarchical levels of image
processing such as segmentation, detection,
classification, and identification of outdoor scenes and
across different sensor modalities such as millimeter
wave, infrared, and visible. Current activities on the
project are reviewed under the following headings: (1)
artificial-intelligence-based generic image segmentation
and object recognition; (2) evidence-confidence paradigms
for image understanding; (3) hierarchical systems theory
for control structures; and (4) invariant methods in
image understanding. Also discussed are scene analysis
and attributed graphs.

DESCRIPTORS: (U) *Image processing, *Pattern recognition,
*Target recognition, Control, Graphs, Theory, Millimeter
waves, Segmented, Detection, Images, Multisensors,
Identification, Outdoor, Recognition, Hierarchies,
Classification, Artificial intelligence, Infrared spectra,
Visible spectra, Control systems, Confidence level,
Information theory

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 535 5/9 5/10 8/2 12/1
8/2

WASHINGTON UNIV ST LOUIS MO BEHAVIOR RESEARCH LAB

PERCEPTONICS INC WOODLAND HILLS CA

(U) A Psychophysiological Mapping of Cognitive Processes.

DESCRIPTIVE NOTE: Progress rept., 1 Mar 83-29 Feb 84, (U) Operator Alertness/Workload Assessment Using Stochastic Model-Based Analysis of Myoelectric Signals.

MAY 84 10P

DESCRIPTIVE NOTE: Interim rept. 1 Oct 82-31 Mar 84,

PERSONAL AUTHORS: Stern, J. A. ; Goldstein, R. ;

APR 84 97P

REPORT NO. 0059-84-1

PERSONAL AUTHORS: Madni, A. M. ; Scopp, R. I. ; Chu, Y. Y. ; Purcell, D. D. ;

CONTRACT NO. F49620-83-C-0059

REPORT NO. PPR-1126-84-4

PROJECT NO. 2313

CONTRACT NO. F49620-83-C-0001

TASK NO. A4

PROJECT NO. 2313

MONITOR: AFOSR

TR-84-0701

TASK NO. A4

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0703

ABSTRACT: (U) This technical report consists of a description of the work done in the Washington University Behavior Research Laboratories supported by the AFOSR. The text describes the hardware assembled for the proposed studies and the software which has been developed for stimulus presentation and execution. The study format is described as well as some preliminary results bearing on the issues to be addressed. (Author)

DESCRIPTORS: (U) *Psychophysiology, *Perception(Psychology), *Computerized simulation, Computer programming, Data acquisition, Data reduction, Stimulation(Physiology), Stimuli, Eye movements, Behavioral Science

IDENTIFIERS: (U) PE81102F, WUAFOSR2313A4

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UNCLASSIFIED REPORT

ABSTRACT: (U) This interim report documents the work done to this point on Autoregressive Integrated Moving-Average (ARIMA) model-based analysis of myoelectric signals. The ARIMA modeling procedure and the hardware required for collecting myoelectric data are described in detail. Pattern analysis methods for characterizing the myoelectric signals under different levels of alertness/workload are discussed. Additionally, the various tasks in the Experimental Control Package that subjects must perform while being monitored are described. Finally, an analysis of data obtained during experimental sessions is provided giving some indication of discriminability of the ARIMA signatures over different task difficulty levels and subjects. Results of this analysis indicate that the first AR parameter is the most useful feature in differentiating workload/alertness level. Additionally, this feature was shown to be reliable for each underlying level of alertness or load in a given task.

DESCRIPTORS: (U) *Operators(Personnel), *Performance(Human), *Pilots, *Workload, *Electromyography, *Monitoring, *Mathematical models, Muscles, Vigilance, Attention, Stochastic processes,

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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Regression analysis, Signal processing, Pattern recognition, Data processing, Microcomputers, Data acquisition, Muscles, Site selection, Electrodes

IDENTIFIERS: (U) *MES(Myoelectric Signals),
*ARIMA(Autoregressive Integrated Moving Average),
Alertness, WUAFOSR2313A4, PE61102F

AD-A144 533 9/4

CITY COLL NEW YORK DEPT OF ELECTRICAL ENGINEERING
(U) Spread Spectrum, Acquisition and Tracking.

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 83-29 Feb 84.

FEB 84 58P

PERSONAL AUTHORS: Schilling, D. L. ;

REPORT NO. RF-447105

CONTRACT NO. AFOSR-83-0102

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR
TR-84-0704

UNCLASSIFIED REPORT

ABSTRACT: (U) This report discusses the following subjects: A New Rapid Acquisition Technique for Direct Sequence Spread Spectrum Communications. The rapid acquisition technique described here can be used in direct sequence spread spectrum systems. The technique employs a double threshold which defines when a decision can be made. These thresholds change at each examination instant. Using this technique a significant reduction in the acquisition time of a direct sequence spread spectrum signal is obtained. A New Double Threshold Acquisition Scheme Applied to the Fading Channel in Frequency Hopping Spread Spectrum.

DESCRIPTORS: (U) *Spread spectrum, *Acquisition, *Frequency shift, *Tracking, *Frequency agility, Fading(Electromagnetic waves), Threshold effects, Channels, Time

IDENTIFIERS: (U) WUAFOSR2305B3, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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AD-A144 527

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COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING

MEDICAL RESEARCH INST OF SAN FRANCISCO CA

(U) Direct Writing of Microstructures for Microelectronics.

(U) The Mechanism of Human Velocity Discrimination.

DESCRIPTIVE NOTE: Rept. no. 1 (Final), 1 Jan 81-31 Dec 83,

DESCRIPTIVE NOTE: Annual scientific rept. 1 Oct 83-30 Mar 84,

JUL 84 89P

APR 84 11P

PERSONAL AUTHORS: Osgood, R. M., Jr;

PERSONAL AUTHORS: McKee, S. P. ;

CONTRACT NO. F49620-82-K-0008, ARPA Order-4487

CONTRACT NO. AFOSR-82-0345

PROJECT NO. 2301

PROJECT NO. 2313

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR
TR-84-0635

MONITOR: AFOSR

TR-84-0702

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) A program to investigate direct laser writing for semiconductor processing is described. In this program the following results were obtained: The first reported fabrication of submicrometer diffraction gratings in GaAs; Development of a new technique for writing patterns of the dielectric material, SiO₂; Measurement of the conductivity and properties of metal interconnects; The first demonstration of laser-enhanced plasma etching; and The first observation of deep-UV enhanced liquid etching of GaAs.

ABSTRACT: (U) Human velocity discrimination depends on the precise detection of minute time variations (under 1 msec). A physiological summation process called 'sequential recruitment' is responsible for this remarkable temporal sensitivity. Precise velocity discrimination is possible with very brief target durations (less than 100 msec). The oculomotor systems used this sensory signal to initiate smooth pursuit eye movements.

DESCRIPTORS: (U) *Writing, *Lasers, *Semiconductors, Microelectronics, Microstructure, Dielectrics, Processing, Fabrication, Etching, Patterns, Gratings(Spectra), Gallium arsenides, Diffraction

DESCRIPTORS: (U) *Velocity, *Discrimination, *Visual perception, Motion, Targets, Moving targets, Judgement(Psychology), Performance(Human)

IDENTIFIERS: (U) Plasma etching, WUAFOSR2301A1, PE61102F

IDENTIFIERS: (U) Stereopsis, WUAFOSR2313A5, PE61102F

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D7IC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 525 20/7 20/9

AD-A144 508 7/4

MARYLAND UNIV COLLEGE PARK DEPT OF ELECTRICAL
ENGINEERING

COLORADO UNIV AT BOULDER

(U) Investigation of Ion Beam Production and Acceleration
Using Linear Electron Beams and a Pulse Powered Plasma
Focus.

(U) Flowing Afterglow Studies of Ion Reaction Dynamics
Using Infrared Chemiluminescence and Laser-Induced
Fluorescence.

DESCRIPTIVE NOTE: Final progress rept. 1 Apr 83-31 Mar 84.

MAR 84 73P

84 35P

CONTRACT NO. AFOSR-83-0145

CONTRACT NO. F49620-83-C-0013

PROJECT NO. 2301

PROJECT NO. 2303

TASK NO. A7

TASK NO. B1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0841

TR-84-0873

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) An intense relativistic electron beam cannot propagate in a metal drift tube when the current exceeds the space charge limit. Very high charge density and electric field gradients (100 to 1000 MV/m) develop at the beam front and the electrons are reflected. When a neutral gas or a plasma is present, collective acceleration of positive ions occur, and the resulting charge neutralization enables the beam to propagate. Experimental results, theoretical understanding, and schemes to achieve high ion energies by external control of the beams front velocity will be reviewed. (Author)

DESCRIPTORS: (U) *Ion beams, *Propagation, *Electron beams, *Plasma accelerators, Tubes, Magnetic fields, Experimental data, Theory, Currents, Space charge, Electric fields, Gradients, Charge density, High density, Electrodes, Metals, Particle accelerator components, Cations

IDENTIFIERS: (U) WUAFOSR2301A7, PE81102F

SUPPLEMENTARY NOTE: Pub. in Gas Phase Ion Chemistry, v3
ch17 p1-39 1984.

Reprint: Flowing Afterglow Studies of Ion Reaction
Dynamics Using Infrared Chemiluminescence and Laser-
Induced Fluorescence.

DESCRIPTORS: (U) *Afterglows, *Ions, *Chemical reactions,
Chemiluminescence, Laser induced fluorescence, Molecular
vibration, Reprints, Infrared radiation

IDENTIFIERS: (U) *Ion molecule reactions, *Flowing
afterglows, WUAFOSR2303A1, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 487 20/10

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

NEW ORLEANS UNIV LA

(U) Heterogeneous Preparation of Singlet Oxygen Using an Ion-Exchange-Resin-Bound Tris(2,2'-bipyridine)-ruthenium(II) Photosensitizer,

(U) Zeeman Studies of Shallow Donors and Excitons in Quantum Wells.

83

DESCRIPTIVE NOTE: Final rept. 1 May 83-29 Feb 84.

9P

PERSONAL AUTHORS: Buell, S. L. ; Demas, J. N. ;

MAR 84 25P

CONTRACT NO. AFOSR-78-3590

PERSONAL AUTHORS: Greene, R. L. ;

PROJECT NO. 2303

CONTRACT NO. AFOSR-83-0120

TASK NO. 82

PROJECT NO. 2308

MONITOR: AFOSR

TASK NO. D9

TR-84-0682

MONITOR: AFOSR

TR-84-0827

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v87 n23 p4875-4881 1983.

ABSTRACT: (U) A theoretical study has been made of the shallow donor and Wannier exciton within a one-dimensional quantum well. The variational method was used with a cylindrical Gaussian basis set. In order to facilitate comparison with future experimental measurements of excited states of these systems, an external magnetic field was assumed perpendicular to the interfaces between the barrier material and the well. Calculations reveal that the choice of matching conditions used at the interfaces has little effect on the binding energies of the ground or first few excited states of the shallow donor, except for well widths considerably smaller than the effective Bohr radius. The results of calculations of the shallow donor ground and first few excited states are presented for a variety of well sizes and magnetic field strengths. Similar results are given for the ground state of the Wannier exciton. (Author)

Reprint: Heterogeneous Preparation of Singlet Oxygen Using an Ion-Exchange-Resin-Bound Tris(2,2'-bipyridine)-ruthenium(II) Photosensitizer.

DESCRIPTORS: (U) *Photosensitivity, *Oxygen, *Synthesis(Chemistry), Production, Ion exchange resins, Ruthenium compounds, Reprints, Catalysts

IDENTIFIERS: (U) Photocatalysts, WJAFOSR2303B2, PE81102F

DESCRIPTORS: (U) *Zeeman effect, *Excitons, *Quantum electronics, Ground state, Shallow depth, Electron donors, Excitation, Barriers, Magnetic fields, One dimensional, Interfaces, Semiconductors, Gallium arsenides, Nuclear binding energy

IDENTIFIERS: (U) Quantum wells, PE81102F, WJAFOSR2308D9

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DYIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A144 483 12/1

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF BIOMEDICAL
ENGINEERING

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) Gaze Control during Horizontal and Vertical Target
Tracking.

(U) Iterative Methods for Elliptic Problems and the
Discovery of 'q'.

DESCRIPTIVE NOTE: Final rept..

DESCRIPTIVE NOTE: Technical rept..

MAR 84 23P

JUL 84 48P

PERSONAL AUTHORS: Bahill, A. T. ;

PERSONAL AUTHORS: Parter, S. V. ;

CONTRACT NO. AFOSR-83-0137

REPORT NO. CSTR-548

PROJECT NO. 2313

CONTRACT NO. AFOSR-82-0275

TASK NO. D9

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A3

TR-84-0698

MONITOR: AFOSR

TR-84-0638

UNCLASSIFIED REPORT

ABSTRACT: (U) The Honeywell oculometer has a noise level of about 0.1 deg(2); eye tracking is noisier than head tracking; vertical eye tracking is noisier than horizontal eye tracking. It has about 25% crosstalk of the horizontal channel into the vertical channel. It has an 84 ms time delay. It is not effective at detecting and rejecting eye blinks; typical eye blink artifacts last 50 to 200 ms. The human tracks best when tracking with eyes alone. Although tracking with head and eyes should be more natural, the human does worse when he uses his head. Head only tracking is the worst of the three conditions.

DESCRIPTORS: (U) *Optical tracking, *Oculometers, *Eye movements, Eye, Performance(Human), Operation, Head(Anatomy), Test methods

IDENTIFIERS: (U) PES1102F, WJAFOSR2313D9

UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers a direct iterative method for solving the linear system $AU = Y$ which arises from the discretization of a boundary value problem involving an elliptic partial differential operator L of order $2m$.

DESCRIPTORS: (U) *Iterations, *Ellipses, *Linear systems, *Problem solving, Boundary value problems, Operators(Mathematics), Differential equations, Approximation(Mathematics), Eigenvalues, Matrices(Mathematics), Estimates, Finite element analysis, Finite difference theory

IDENTIFIERS: (U) WJAFOSR2304A3, PES1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 482 20/4

CALIFORNIA INST OF TECH PASADENA

(U) Experimental Investigation on the Effects of Chemical Heat Release in the Reacting Turbulent Plane Shear Layer.

DESCRIPTIVE NOTE: Doctoral thesis.

JAN 81 128P

PERSONAL AUTHORS: Wallace, A. K. ;

CONTRACT NO. F49620-79-C-0159

PROJECT NO. 2307

TASK NO. A3

MONITOR: AFOSR
TR-84-0650

UNCLASSIFIED REPORT

ABSTRACT: (U) A chemically reacting shear layer between various gases was investigated in a new type of blow-down wind tunnel. The gas streams were inert (helium, nitrogen or argon), but carried up to 10% concentration of reactants, one being ozone and the other nitric oxide. The resulting reaction, $O_3 + NO$ yields $NO_2 + O_2$, was essentially diffusion limited and spontaneous, enabling the temperature rise to be varied at will from zero up to 200 C mean. Flows of Reynolds number up to 5×10^5 to the fourth power were investigated.

DESCRIPTORS: (U) *Turbulent boundary layer, *Chemical reactions, *Heat of reaction, Shear properties, Layers, Blowdown, Wind tunnels, Reynolds number, Flow, Helium, Argon, Gases, Ozone, Nitrogen oxides

IDENTIFIERS: (U) WJAFOSR2307A3, PE81102F

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AD-A144 481 20/5

DARTMOUTH COLL HANOVER N H DEPT OF PHYSICS AND ASTRONOMY

(U) High Power Millimeter Wavelength Coherent Radiation Sources.

DESCRIPTIVE NOTE: Scientific rept. 1 Feb 83-31 Jan 84.

JUN 84 79P

PERSONAL AUTHORS: Walsh, J. E. ;

CONTRACT NO. AFOSR-82-0168

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-84-0638

UNCLASSIFIED REPORT

ABSTRACT: (U) During the reporting period, Cerenkov Maser resonators with a rectangular configuration were analyzed, constructed and experimentally tested. All of the previous work was based upon cylindrical resonators, a choice which was convenient because of the intrinsic symmetry of the beam transport and focussing. In many potential applications, however, an amplifier would be more useful than an oscillator and a structure which, coupled to a linearly-polarized field would then be far more convenient. It was for this purpose that the rectangular dielectric slab waveguide structures were analyzed and tested.

DESCRIPTORS: (U) *Masers, *Millimeter waves, Resonators, Coherent electromagnetic radiation, Beams (Electromagnetic), Waveguides, Electron beams, Cerenkov radiation, High power

IDENTIFIERS: (U) WJAFOSR2301A8, PE81102F

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UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 477 7/3 7/2

GEORGIA UNIV ATHENS DEPT OF CHEMISTRY

(U) Bis(dialkylamino)phosphines.

84 8P

PERSONAL AUTHORS: King, R. B.; Sundaram, P. M.;

CONTRACT NO. AFOSR-81-0051

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0875

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry.
v49 n10 p1784-1789 1984.

Reprint: Bis(dialkylamino)phosphines.

DESCRIPTORS: (U) *Phosphine, Chemical reactions,
Stereochemistry, Reprints

IDENTIFIERS: (U) *Phosphine/Bis(Dialkylamino), Steric
hindrance, Lithium aluminum hydride, WUAFOSR230382,
PE61102F

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UNCLASSIFIED

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AD-A144 478 7/5

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Interactions of Ruthenium(II) Photosensitizers with
Nonionic Surfactants: The Binding Region and Specific-
Anion Effects.

84 8P

PERSONAL AUTHORS: Hauenstein, B. L., Jr.; Dressick, W. J.;
Gilbert, T. B.; Demas, J. N.; DeGraff, B. A.;

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-08278

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0878

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry.
v88 n9 p1902-1905 1984.

Reprint: Interactions of Ruthenium(II) Photosensitizers
with Nonionic Surfactants: The Binding Region and
Specific-Anion Effects.

DESCRIPTORS: (U) *Photosensitivity, *Surface active
substances, *Ruthenium compounds, Covalent bonds, Anions,
Molecule molecule interactions, Reprints

IDENTIFIERS: (U) Micelles, WUAFOSR230382, PE61102F

AD-A144 478

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A144 475 7/5

AD-A144 474 3/2

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

(U) Energetics and Dynamics of Radical Pairs in Micelles. Measurement of the Average Singlet-Triplet Energy Gap by Means of the Magnetic Field Dependence of (13)C CIDNP.

(U) Two New Extremely Hot Pulsating White Dwarfs.

84 4P

APR 84 9P

PERSONAL AUTHORS: Zimmt, M. B. ; Doubleday, C. , Jr. ; Turro, N. J. ;

PERSONAL AUTHORS: Bond, H. E. ; Grauer, A. D. ; Green, R. F. ; Liebert, J. W. ;

CONTRACT NO. AFOSR-81-0013

CONTRACT NO. AFOSR-82-0192

PROJECT NO. 2303

PROJECT NO. 2301

TASK NO. B2

TASK NO. A2

MONITOR: AFOSR TR-84-0661

MONITOR: AFOSR TR-84-0852

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 n11 p3363-3365 1984.

SUPPLEMENTARY NOTE: Pub. in Astrophysical Jnl., v278 n2 p751-757, 15 Apr 84.

Reprint: Energetics and Dynamics of Radical Pairs in Micelles. Measurement of the Average Singlet-Triplet Energy Gap by Means of the Magnetic Field Dependence of (13)C CIDNP.

Reprint: Two New Extremely Hot Pulsating White Dwarfs.

DESCRIPTORS: (U) *Photolysis, Free radicals, Carbon, Radioactive isotopes, Magnetic fields, Energetic properties, Dynamics, Reprints

DESCRIPTORS: (U) *Dwarf stars, Photometry, Ultraviolet spectra, Reprints

IDENTIFIERS: (U) Micelles, WJAFOSR2303B2, PE61102F

IDENTIFIERS: (U) White dwarf stars, WJAFOSR2301A2, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLOS

AD-A144 471 18/3 8/11

AD-A144 489 21/8.2

CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB

ILLINOIS UNIV AT URBANA DEPT OF MECHANICAL AND INDUSTRIAL
ENGINEERING(U) Source Models and Yield-Scaling Relations for
Underground Nuclear Explosions at Amchitka Island,(U) Deflagration to Shock to Detonation Transition of
Energetic Propellants.

JUN 84 22P

PERSONAL AUTHORS: Lay, T.; Helmsberger, D. V.; Harkrider, D.
G.;DESCRIPTIVE NOTE: Annual technical rept., 1 Jun 83-30 May
84.

CONTRACT NO. F49620-83-C-0025

JUL 84 44P

PROJECT NO. 4397

PERSONAL AUTHORS: Krier, H.; Butler, P. B.; Cudak, C.;

TASK NO. A3

REPORT NO. UTLU-ENG-84-4008

MONITOR: AFOSR
TR-84-0645

CONTRACT NO. AFOSR-81-0145

PROJECT NO. 2308

UNCLASSIFIED REPORT

TASK NO. A1

SUPPLEMENTARY NOTE: Pub. in Bulletin of the Seismological
Society of America, v74 n3 p843-862 Jun 84.

MONITOR: AFOSR

TR-84-0634.

Reprint: Source Models and Yield-Scaling Relations for
Underground Nuclear Explosions at Amchitka Island.DESCRIPTORS: (U) *Nuclear explosion testing, *Seismic
data, Broadband, Aleutian Islands, Sources, Depth,
Underground explosions, Yield(Nuclear explosions),
Scaling factors, Mathematical models, ReprintsIDENTIFIERS: (U) Amchitka Island, WUAFOSR4397A3,
PE61102F

Availability: Document partially illegible.

UNCLASSIFIED REPORT

ABSTRACT: (U) It is well known that explosive-based
propellants are susceptible to detonation from the
controlled deflagration mode of combustion. In some
instances a confined zone of granulated propellant
adjacent to a zone of cast propellant can provide a rapid
enough pressure-rise rate to shock initiate the cast
material. If the cast propellant has voids, the
detonation will initiate at some location ahead of the
granulated bed/cast material interface. This report is a
summary of the research activities that focus on the
analysis and modeling of the physics of such highly
transient flows.DESCRIPTORS: (U) *Deflagration, *Solid rocket
propellants, *Detonations, Castings, Transitions, Models,
Physics, Flow, Transients, Shock(Mechanics), Explosives,
Voids

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 485 12/1

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) A Study of Some Multi-Grid Ideas.

DESCRIPTIVE NOTE: Technical rept..

JUN 84 48P

PERSONAL AUTHORS: Kamowitz, D.; Parter, S. V.;

REPORT NO. CSTR-545

CONTRACT NO. AFOSR-82-0275

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-84-0637

UNCLASSIFIED REPORT

ABSTRACT: (U) In an effort to understand certain ideas and concepts associated with multi-grid iterations the authors give an in-depth study of a particular simple problem. They consider a standard finite-difference system associated with a two-point boundary value problem. $-(pu' + bu' + qu = 0, u(0) = u(1) = 0$. The operators Ih_{2h} are 'operator' based interpolation and projection operators while the smoothers are the damped Jacobi iterations with parameter $\alpha > 0$. This document determines the exact rates of convergence for the two-grid scheme and upper bounds for the multi-grid schemes. Experimental results are discussed. (Author)

DESCRIPTORS: (U) *Grids, *Iterations, *Finite difference theory, Operators(Mathematics), Boundary value problems, Partial differential equations, Interpolation, Convergence, Eigenvectors, Experimental data, Estimates

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A3

AD-A144 485

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AD-A144 458 7/5 7/4

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Properties of Osmium(II) Photosensitizers in Aqueous and Sodium Lauryl Sulfate Micellar Media.

84 8P

PERSONAL AUTHORS: Dressick, W. J.; Raney, K. W.; Demas, J. N.; DeGraff, B. A.;

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-06249

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0679

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v23 n7 p875-880 1984.

Reprint: Properties of Osmium(II) Photosensitizers in Aqueous and Sodium Lauryl Sulfate Micellar Media.

DESCRIPTORS: (U) *Photosensitivity, *Electrochemistry, *Photochemical reactions, *Spectroscopy, *Osmium compounds, Complex compounds, Solar energy, Reprints

IDENTIFIERS: (U) Micelles, PE81102F, WUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO8F

AD-A144 457 12/1

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

(U) Deterministic and Stochastic Optimization Problems of Bolza Type in Discrete Time.

83 20P

PERSONAL AUTHORS: Rockafellar, R. T. ; Wets, R. J. B. ;

CONTRACT NO. F49620-82-K-0012

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0604

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Stochastics, v10 p273-312
1983.

Reprint: Deterministic and Stochastic Optimization Problems of Bolza Type in Discrete Time.

DESCRIPTORS: (U) *Calculus of variations,
*Determinants(Mathematics), *Stochastic processes,
Optimization, Dynamic programming, Lagrangian functions,
Multiplication, Reprints

IDENTIFIERS: (U) Bolza type, PE61102F, WUAFOSR2304A8

AD-A144 458 11/3 20/2

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Theoretical Investigations of Elementary Processes in the Chemical Vapor Deposition of Silicon from Silane. Unimolecular Decomposition of SiH4.

MAY 84 13P

PERSONAL AUTHORS: Viswanathan, R. ; Thompson, D. L. ; Raff, L. M. ;

CONTRACT NO. AFOSR-82-0311

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-84-0688

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80
n9 p4230-4240, 1 May 84.

Reprint: Theoretical Investigations of Elementary Processes in the Chemical Vapor Deposition of Silicon from Silane. Unimolecular Decomposition of SiH4.

DESCRIPTORS: (U) *Silicon, *Vapor deposition, Silanes,
Decomposition, Dynamics, Theory, Reprints

IDENTIFIERS: (U) ACVD(Chemical Vapor Deposition),
PE61102F, WUAFOSR2303A2

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 455

12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Negative Association of Random Variables, with Applications.

83

12P

PERSONAL AUTHORS: Jorg-Dev, K. ; Proschan, F. ;

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0885

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in the Annals of Statistics, v11
n1 p286-295 1983.

Reprint: Negative Association of Random Variables, with Applications.

DESCRIPTORS: (U) *Random variables, Multivariate analysis, Inequalities, Statistical distributions, Reprints

IDENTIFIERS: (U) Negative association, PE81102F, WJAFDSR2304A5

AD-A144 438

6/16

12/1

WASHINGTON UNIV SEATTLE DEPT OF PSYCHOLOGY

(U) Mathematical Models of the Event Related Potential.

DESCRIPTIVE NOTE: Interim rept. 30 Sep 83-1 Apr 84.

APR 84

34P

PERSONAL AUTHORS: Hunt, E. B. ;

CONTRACT NO. AFDSR-83-0289

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-84-0899

UNCLASSIFIED REPORT

ABSTRACT: (U) In electrophysiology, the Event Related Potential is assumed to be composed of several underlying component wave forms. Principal Component Analysis is a statistical technique that has been used to uncover the components by analysis of the observed wave form. The mathematical assumptions behind Principal Component Analysis are examined, and their plausibility is questioned. It is pointed out that under certain conditions the component forms may not accurately be recovered by Principal Component Analysis. Under other circumstances violations of some of the mathematical assumptions does not appear to affect the accuracy of recovery of component waveforms. The points made are illustrated by an analysis of simulated wave forms constructed from known components.

DESCRIPTORS: (U) *Electroencephalography, *Statistical analysis, Accuracy, Waveforms, Electrophysiology, Simulation, Mathematical models

IDENTIFIERS: (U) Event related potential, Principal component analysis, PE81102F, WJAFDSR2313A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO8F

AD-A144 436 21/2 20/4 21/8.2 12/1 AD-A144 436 CONTINUED

PRINCETON COMBUSTION RESEARCH LABS INC NJ

(U) Analysis of Combustion Oscillations in Heterogeneous Systems.

DESCRIPTIVE NOTE: Final rept. 15 Mar 82-14 Mar 83.

NOV 83 61P

PERSONAL AUTHORS: Ben-Reuven, M.; Summerfield, M.;

REPORT NO. PCRL-FR-83-005

CONTRACT NO. F49620-82-C-0082

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-84-0700

UNCLASSIFIED REPORT

ABSTRACT: (U) This analysis is aimed at the near-wall processes in an injected, axisymmetric, viscous flow. It is a part of an overall study of solid propellant rocket instability, in which cold flow simulation is evaluated as a tool to elucidate possible instability-driving mechanisms. One such prominent mechanism seems to be visco-acoustic coupling, as indicated by earlier detailed order of magnitude analysis. The major component of the overall study involves numerical simulation of the full set of coreflow equations of motion (nonsteady, axisymmetric) by a modified McCormack integration technique. To clarify some of the physical interactions inherent in the various regimes of the flowfield, two (separate) singular perturbation analyses have been carried out. The head-end boundary regime, and the injected sidewall layer, both involve appreciable viscous dissipation, and hence are characterized by predominantly parabolic differential systems. The inverse square root of the injection Reynolds number serves as a small-perturbation quantity.

DESCRIPTORS: (U) *Axially symmetric flow, *Viscous flow, *Mathematical models, *Combustion stability, *Boundary layer flow, Combustion, Oscillation, Heterogeneity, Integration, Numerical analysis, Solid propellant rocket

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 435 9/2

AD-A144 414 12/2 9/2

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

SRI INTERNATIONAL MENLO PARK CA

(U) Implementation of Logical Query Languages for Databases.

(U) Research on Parallelism in Problem-Solving Systems.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Annual rept., 1 Sep 82-31 Aug 83.

MAY 84 43P

JUL 84 9P

PERSONAL AUTHORS: Ullman, J. D. ;

PERSONAL AUTHORS: Wilkins, D. E. ;

REPORT NO. STAN-CS-84-1000

CONTRACT NO. F49620-79-C-0188

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A7

TASK NO. A7

MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0595

TR-84-0840

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) We examine methods of implementing queries about relational databases in the case that these queries are expressed in first-order logic as a collection of Horn clauses. Because queries may be defined recursively, straightforward methods of query evaluation do not always work, and a variety of strategies have been proposed to handle subsets of recursive queries. We shall express such query evaluation techniques as 'capture rules' on a graph representing clauses and predicates. The essential property of capture rules is that they can be applied independently, thus providing a clean interface for query-evaluation systems that use several different strategies in different situations. We show how rules suggested previously can be fit into this framework, and we propose some new capture rules and generalizations of old ones.
(Author)

DESCRIPTORS: (U) *Data bases, *Interrogation, *Data management, *Information processing, Graphs, Logic, Recursive functions, Man computer interface, Programming languages, Strategy, Language

IDENTIFIERS: (U) Horn clauses, *Query languages, Relational data bases, Recursive queries, Capture rules, PE81102F, WUAFOSR2304A7

AD-A144 435

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PAGE 51 EVL08F

ABSTRACT: (U) This report describes the progress to date on work to date under the contract. Research on planning and problem-solving systems was begun at SRI International in September 1979. Progress has been described in detail in three annual reports (1980, 1981, and 1982). The main task of this research program is to develop powerful methods of representing, generating and executing hierarchical plans that contain parallel actions. Execution involves monitoring the state of the world and possibly replanning if things do not proceed as expected. Two different approaches to these problems are being pursued under this contract. The first is heuristic; it involves building an actual computer program that provides a representation from which it then generates plans. This approach comprises the majority of the effort in this project. The second approach is to investigate the theoretical foundations of planning. This will not, in all likelihood, result in a program, but it will formalize the planning problem and one solution to it.
(Author)

DESCRIPTORS: (U) *Problem solving, *Hierarchies, *Planning, Heuristic methods, Research management, Robotics, Artificial intelligence, Computer programs, Cognition

IDENTIFIERS: (U) SIPE(System For Interactive Planning and Execution Monitoring), PE81102F, WUAFOSR2304A7

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 405 20/8 7/5

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Phase Plane Method for Deconvolution of Luminescence Decay Data with a Scattered-Light Component.

JUL 83 5P

PERSONAL AUTHORS: Love, J. C. ; Demas, J. N. ;

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-08279

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0877

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v58 n1 p82-85 1984.

Reprint: Phase Plane Method for Deconvolution of Luminescence Decay Data with a Scattered-Light Component.

DESCRIPTORS: (U) *Fluorescence, *Luminescence, Convolution, Decay, Light scattering, Computerized simulation, Reprints

IDENTIFIERS: (U) *Deconvolution, Phase plane method, PEB1102F, WUAFOSR230382

AD-A144 404 7/4

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Unimolecular Dissociation of Methane: A Trajectory Study Using Metropolis Sampling.

JUN 84 12P

PERSONAL AUTHORS: Raff, L. M. ; Viswanathan, R. ; Thompson, D. L. ;

CONTRACT NO. AFOSR-82-0311

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-84-0871

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n12 p8141-8149, 15 Jun 84.

Reprint: Unimolecular Dissociation of Methane: A Trajectory Study Using Metropolis Sampling.

DESCRIPTORS: (U) *Chemical dissociation, *Methane, Rates, Chemical reactions, Trajectories, Monte Carlo method, Reprints

IDENTIFIERS: (U) *Unimolecular reactions, PEB1102F, WUAFOSR2303A2

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 402 7/5 20/5

AD-A144 401 20/6 20/5

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

CHICAGO UNIV IL JAMES FRANCK INST

(U) Deactivation of I(52P1/2) by CF3I, CH3I, C2H5I, and CH4,

(U) Shot-Noise-Limited Detection Scheme for Two-Beam Laser Spectroscopies,

84 10P

JAN 84 5P

PERSONAL AUTHORS: Gu,Z. N.; Young, A. T.; Houston, P. L.;

PERSONAL AUTHORS: Andor, L.; Lorincz, A.; Stenion, J.; Smith, D. D.; Rice, S. A.;

CONTRACT NO. F49620-83-K-0012

CONTRACT NO. F49620-83-C-0002

PROJECT NO. 2303

TASK NO. B1

PROJECT NO. 2303

MONITOR: AFOSR
TR-84-0672

MONITOR: AFOSR
TR-84-0687

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Jnl. of Chemical Kinetics, v18 p669-677 1984.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Rev. Sci. Instrum., v55 n1 p84-87 Jan 84.

Reprint: Deactivation of I(52P1/2) by CF3I, CH3I, C2H5I, and CH4.

Reprint: Shot-Noise-Limited Detection Scheme for Two-Beam Laser Spectroscopies.

DESCRIPTORS: (U) *Photolysis, *Deactivation, *Lasers, Iodine, Iodides, Alkyl radicals, Relaxation, Reprints

DESCRIPTORS: (U) *Shot noise, *Detection, Demodulation, Linearity, Response, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

IDENTIFIERS: (U) *Laser spectroscopy, *Two beam laser spectroscopy, PE81102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 400 8/7 18/3 8/11

AD-A144 392 7/4

CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) The Effects of Tectonic Release on Short-Period P Waves from NTS Explosions.

(U) Electronic Structure of the Helium Molecular Anion He2.

DESCRIPTIVE NOTE: Scientific journal article.

JUN 84 26P

APR 84 5P

PERSONAL AUTHORS: Lay, T. ; Wallace, T. C. ; Helmerger, D. V. ;

PERSONAL AUTHORS: Michels, H. H. ;

CONTRACT NO. F49620-83-C-0025

REPORT NO. UTRC-928533-2

PROJECT NO. 4397

CONTRACT NO. F49620-83-C-0094

TASK NO. A3

PROJECT NO. 2301

MONITOR: AFOSR
TR-84-0858

TASK NO. A7

MONITOR: AFOSR
TR-84-0858

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Bulletin of the Seismological Society of America, v74 n3 p819-842 Jun 84.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review Letters, v52 n16 p1413-1418, 18 Apr 84.

Reprint: The Effects of Tectonic Release on Short-Period P Waves from NTS Explosions.

Reprint: Electronic Structure of the Helium Molecular Anion He2.

DESCRIPTORS: (U) *Primary waves (Seismic waves), *Faults (Geology), Tectonics, Release, Joints, Nuclear explosion testing, Seismic data, Azimuth, Amplitude, Earth models, Underground explosions, Nevada, Reprints

DESCRIPTORS: (U) *Helium, *Anions, *Molecular structure, Potential energy, Wave functions, Reprints

IDENTIFIERS: (U) Pahute Mesa, Tectonic release, PE61102F, WUAFOSR4397A3

IDENTIFIERS: (U) *Electronic structure, PE61102F, WUAFOSR2301A7

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 391 9/1

TEXAS TECH UNIV LUBBOCK

(U) Electrode Erosion Phenomena in a High-Energy Pulsed Discharge.

MAR 84 12P

PERSONAL AUTHORS: Donaldson, A. L.; Hagler, M. O.; Kristiansen, M.; Jackson, G.; Hatfield, L.;

CONTRACT NO. AFOSR-84-0015

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-84-0843

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Plasma Science, vps-12 n1 p28-38 Mar 84.

Reprint: Electrode Erosion Phenomena in a High-Energy Pulsed Discharge.

DESCRIPTORS: (U) *Electrodes, *Electric discharges, Erosion, Pulses, Spark gaps, High energy, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2301A7

AD-A144 388

20/8

OREGON UNIV EUGENE

(U) Atomic Inner-Shell Transitions,

APR 84 9P

PERSONAL AUTHORS: Crasemann, B.; Chen, M. H.; Mark, H.;

CONTRACT NO. F49820-84-C-0039, ARPA Order-4087

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR
TR-84-0857

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Optical Society of America B, v1 n2 p224-231 Apr 84.

Reprint: Atomic Inner-Shell Transitions.

DESCRIPTORS: (U) *Nuclear shell models, *Transitions, Nuclear binding energy, Ions, Relativity theory

IDENTIFIERS: (U) *Atomic inner shells, WUAFOSR2301A4, PE81102F

AD-A144 391

AD-A144 388

UNCLASSIFIED

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 380 12/1

AD-A144 375 20/8

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

OREGON UNIV EUGENE DEPT OF PHYSICS

(U) Random Averaging of Vector Elements.

(U) M X-Ray Emission Rates in Dirac-Fock Approximation.

JUN 84 5P

JUL 84 8P

PERSONAL AUTHORS: Proschan, F. ; Shaked, M. ;

PERSONAL AUTHORS: Chen, M. H. ; Crasemann, B. ;

CONTRACT NO. F49620-82-K-0007, NSF-WCS82-00088

CONTRACT NO. F49620-84-C-0039, ARPA Order-4087

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A5

TASK NO. A4

MONITOR: AFOSR
TR-84-0859

MONITOR: AFOSR
TR-84-0895

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. of Applied Mathematics, v44 n3 p587-390 Jun 84.

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v30 n1 p170-178 Jul 84.

Reprint: Random Averaging of Vector Elements.

Reprint: M X-Ray Emission Rates in Dirac-Fock Approximation.

DESCRIPTORS: (U) *Vector analysis, Real numbers, Iterations, Reprints

DESCRIPTORS: (U) *X rays, *Emission, Rates, Transitions, Relativity theory, Reprints

IDENTIFIERS: (U) *Random averaging, PE81102F, WUAFOSR2304A5

IDENTIFIERS: (U) *Atomic inner shells, Dirac Fock approximation, WUAFOSR2301A4, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 388 12/1 20/1

AD-A144 381 12/1 9/3

DELAWARE UNIV NEWARK APPLIED MATHEMATICS INST

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) The Inverse Scattering Problem for Time-Harmonic Acoustic Waves.

(U) Spatio-Temporal Spectral Analysis by Eigenstructure Methods.

JUL 84 30P

DESCRIPTIVE NOTE: Technical rept..

PERSONAL AUTHORS: Colton, D. ;

84 43P

CONTRACT NO. AFOSR-81-0103

PERSONAL AUTHORS: Wax, M. ; Shan, T. J. ; Kailath, T. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-83-0228

TASK NO. A4

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0853

TASK NO. A8

MONITOR: AFOSR
TR-84-0487

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Review, v28 n3 p323-350
Jul 84.

UNCLASSIFIED REPORT

Reprint: The Inverse Scattering Problem for Time-Harmonic Acoustic Waves.

ABSTRACT: (U) This paper presents new algorithms for estimating the spatio-temporal spectrum of the signals received by a passive array. The algorithms are based on the eigenstructure of the covariance and spectral-density matrices of the received signals. These allow partial correlation between the sources and thus are applicable to certain kinds of multipath problems. Simulation results that illustrate the performance of the new algorithms are presented. (Author)

DESCRIPTORS: (U) *Inverse scattering, *Mathematical models, *Acoustic waves, Operators(Mathematics), Far field, Optimization, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A4

DESCRIPTORS: (U) *Algorithms, *Spectrum analysis, Time domain, Computerized simulation, Estimates, Eigenvectors, Multipath transmission, Covariance, Signals, Impingement, Two dimensional, Matrices(Mathematics), Narrowband, Broadband

IDENTIFIERS: (U) Passive arrays, Frequency domain

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 357 20/8 12/1

AD-A144 355 9/5

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL
ENGINEERING

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Multi-Disciplinary Techniques for Understanding Time-
Varying Space-Based Imagery.

(U) A New Adaptive Antenna System for Coherent Signals and
Interference.

DESCRIPTIVE NOTE: Annual rept. 1 May 83-30 May 84.

DESCRIPTIVE NOTE: Technical rept..

JUN 84 180P

OCT 83 8P

PERSONAL AUTHORS: Casasent, D. ; Sanderson, A. ; Kanada, T. ;

PERSONAL AUTHORS: Shan, T. J. ; Kallath, T. ;

CONTRACT NO. F49620-83-C-0100

CONTRACT NO. F49620-78-C-0058, AFOSR-83-0228

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A7

TASK NO. A8

MONITOR: AFOSR
TR-84-0597

MONITOR: AFOSR
TR-84-0488

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) A multi-disciplinary program for space-
based image processing is reported. This project combines
optical and digital processing techniques and pattern
recognition, image understanding and artificial
intelligence methodologies. Time-change image processing
was recognized as the key issue to be addressed. Three
time-change scenarios were defined based on the frame
rate of the data change. This report details the recent
research on: various statistical and deterministic image
features, recognition of sub-pixel targets in time-
varying imagery, and 3-D object modeling and recognition.
(Author)

DESCRIPTORS: (U) *Image processing, *Space based,
*Mathematical models, Image registration, Optical
processing, Digital systems, Pattern recognition,
Artificial intelligence, Scenarios, Targets, Three
dimensional, Graphs, Algorithms, Models, Air Force
research

IDENTIFIERS: (U) Image understanding, Scene analysis,
PE81102F, WUAFOSR2304A7

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SUPPLEMENTARY NOTE: Presented at the Asilomar Conference
(17th), Oct 83. Sponsored in part by Contracts DAAG29-78-
C-0215 and DAAG29-81-K-0057.

ABSTRACT: (U) In this paper the authors introduce a new
adaptive antenna system able to work well even when the
desired signal and the interference are coherent. The
present adaptive beamformers fail to operate in these
cases. The results of simulations appear to confirm the
theoretical predictions. (Author)

DESCRIPTORS: (U) *Processing equipment, *Adaptive
systems, *Antenna arrays, *Beam forming, Computerized
simulation, Coherence, Signals, Antennas, Theory, Signals,
Predictions, Coherence

IDENTIFIERS: (U) Coherent processors, Weight vectors,
Coherent interference, PE81102F, WUAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOGF

AD-A144 348 7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Stimulated Emission Spectroscopy: A Complete Set of Vibrational Constants for X 1A1 Formaldehyde.

JUN 84 13P

PERSONAL AUTHORS: Reisner, D. E. ; Field, R. W. ; Kinsey, J. L. ; Dai, M. L. ;

CONTRACT NO. F49620-83-C-0010

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0870

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n12 p5968-5978, 15 Jun 84.

Reprint: Stimulated Emission Spectroscopy: A Complete Set of Vibrational Constants for X 1A1 Formaldehyde.

DESCRIPTORS: (U) *Formaldehyde, *Emission spectroscopy, Pumping, Vibrational spectra, Diatomic molecules, Polyatomic molecules, Reprints

IDENTIFIERS: (U) Stimulated emission pumping, PE81102F, WJAFOSR230381

AD-A144 347 20/8 20/10

CHICAGO UNIV IL JAMES FRANCK INST

(U) Very Low Energy Collision Induced Vibrational Relaxation: An Overview.

83 31P

PERSONAL AUTHORS: Rice, S. A. ; Cerjan, C. ;

CONTRACT NO. F49620-83-C-0002

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0888

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Laser Chemistry, v2 p137-168 1983.

Reprint: Very Low Energy Collision Induced Vibrational Relaxation: An Overview.

DESCRIPTORS: (U) *Particle collisions, *Quantum theory, Molecular vibration, Low energy, Relaxation, Literature surveys, Reprints

IDENTIFIERS: (U) Overviews, PE81102F, WJAFOSR230381

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO8F

AD-A144 348 7/4

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Excited-State Lifetime Measurements: Linearization of the Forster Equation by the Phase-Plane Method,

DEC 83 4P

PERSONAL AUTHORS: Love, J. C.; Demas, J. N.;

CONTRACT NO. AFOSR-78-3590

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0881

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Review of Scientific Instruments, v54 n12 p1787-1789 Dec 83.

Reprint: Excited-State Lifetime Measurements: Linearization of the Forster Equation by the Phase-Plane Method.

DESCRIPTORS: (U) *Molecules, *Excitation, *Fluorescence, *Molecular states, Life span(Biology), Resonance, Luminescence, Reprints, Energy transfer, Reprints

IDENTIFIERS: (U) *forster equation, PE81102F, WJAFOSR2303B2

AD-A144 345 3/2

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR

(U) Experimental Evidence of the Uniqueness of Phase Retrieval from Intensity Data,

84 13P

PERSONAL AUTHORS: Flenup, J. R.;

REPORT NO. ERIM-181900-8-J

CONTRACT NO. F49620-82-K-0018

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0847

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Indirect Imaging, p99-109 1984.

Reprint: Experimental Evidence of the Uniqueness of Phase Retrieval from Intensity Data.

DESCRIPTORS: (U) *Radio astronomy, Phase control, Two dimensional, Intensity, Reprints

IDENTIFIERS: (U) Phase retrieval, PE81102F, WJAFOSR2311A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 328 20/7

AD-A144 319 9/2

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Theoretical Studies of Tunneling Processes in Three-Body Exchange Reactions of van der Waals Rare Gas Dimers.

(U) Approaches for Updating Databases with Incompleted Information and Nulls.

APR 84 10P

APR 84 10P

PERSONAL AUTHORS: Turner, R. A. Raff, L. M. ; Thompson, D. L.

PERSONAL AUTHORS: Keller, A. ; Wilkins, M. W. ;

CONTRACT NO. AFOSR-82-0311

CONTRACT NO. N00039-82-G-0250, AFOSR-80-0212

PROJECT NO. 2303

PROJECT NO. 2304

TASK NO. A2

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MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0382

TR-84-0662

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n7 p3189-3196 Apr 84.

SUPPLEMENTARY NOTE: Presented at the IEEE Computer Data Engineering Conference Proceedings, Los Angeles, CA, Apr 84.

Reprint: Theoretical Studies of Tunneling Processes in Three-Body Exchange Reactions of van der Waals Rare Gas Dimers.

ABSTRACT: (U) In this paper we consider approaches to updating databases containing null values and incomplete information. Our approach distinguishes between modeling incompletely known worlds and modeling changes in these worlds. As an alternative to the open and closed world assumptions, we propose the modified closed world assumption. Along with the discussion of updating, we address some issues of refining incompletely specified information. (Author)

DESCRIPTORS: (U) *Tunneling, *Dimers, *Collisions, Rare gases, Theory, Exchange reactions, Reprints

IDENTIFIERS: (U) Van Der Waals complexes, WJAFOSR2303A2, PE61102F

DESCRIPTORS: (U) *Data bases, *Global, *Models, Change detection, Deficiencies, Accuracy, Data processing

IDENTIFIERS: (U) WJAFOSR2304A2, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 318 12/1 20/8

ROCHESTER UNIV NY DEPT OF PHYSICS AND ASTRONOMY

(U) Detection of Gratings Hidden by Diffusers Using Intensity Interferometry,

APR 80 11P

PERSONAL AUTHORS: Newman, D. ; Dainty, J. C. ;

CONTRACT NO. AFOSR-81-0003

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0848

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Optical Society of America A, v1 n4 p403-411 Apr 84.

Reprint: Detection of Gratings Hidden by Diffusers Using Intensity Interferometry.

DESCRIPTORS: (U) *Correlation techniques, *Gratings(Spectra), *Detection, Coherence, Information processing, Photons, Diffusion, Interferometry, Reprints

IDENTIFIERS: (U) WUAFOSR2311A1, PEB1102F

AD-A144 312 3/2

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

(U) The Elusive Variability of BD +10 deg 2179,

84 4P

PERSONAL AUTHORS: Grauer, A. D. ; Drilling, J. S. ; Schonberger, D. ;

CONTRACT NO. AFOSR-82-0182, AFOSR-77-3218

PROJECT NO. 2301

TASK NO. A2

MONITOR: AFOSR
TR-84-0851

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Astronomy and Astrophysics, v133 p285-287 1984.

Reprint: The Elusive Variability of BD 10 deg 2179.

DESCRIPTORS: (U) *Stars, Photometry, Stability, Reprints

IDENTIFIERS: (U) Hydrogen-deficient stars, High speed photometry, PEB1102F, WUAFOSR2301A2

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SEARCH CONTROL NO. EVL08F

AD-A144 304 20/8

AD-A144 302 11/2 13/8 20/11

FLORIDA UNIV GAINESVILLE QUANTUM THEORY PROJECT

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) A Study of Be₂ with Many-Body Perturbation Theory and a Coupled-Cluster Method Including Triple Excitations,

(U) Strengthening and Strength Uniformity of Structural Ceramics.

MAY 84 8P

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Jan 84,

PERSONAL AUTHORS: Lee, Y. S.; Bartlett, R. J. ;

APR 84 76P

CONTRACT NO. AFOSR-82-0028

PERSONAL AUTHORS: Lange, F. F. ;

PROJECT NO. 2301

REPORT NO. SC5295.3AR

TASK NO. A4

CONTRACT NO. F49820-81-C-0038

MONITOR: AFOSR
TR-84-0844

PROJECT NO. 2308

TASK NO. A2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80
n9 p4371-4377, 1 May 84

MONITOR: AFOSR
TR-84-0808

UNCLASSIFIED REPORT

Reprint: A Study of Be₂ with Many-Body Perturbation Theory and a Coupled-Cluster Method Including Triple Excitations.

ABSTRACT: (U) The goal of this work is to identify the processing flaws that limit the strength of sintered ceramics, and to engineer uniform microstructures which either eliminate or minimize the size of these processing flaws. During the first year, a major advance was made by uncovering the fact that agglomerates in powders produce crack-like voids that severely limit the strength of sintered ceramics. Crack-like voids produced by the differential sintering of agglomerates relative to their surrounding powder matrix can be the most detrimental strength degrading flaw in sintered ceramics. As detailed and summarized in the review prepared for a 1984 ASM Conference on Materials for Future Energy Systems, colloidal approaches to powder processing and consolidation can minimize the size of soft agglomerates (those that can be broken apart with surfactants) and hard agglomerates (eliminated by sedimentation of colloidal suspensions). Work has shown that the elimination of the large, soft agglomerates with surfactants increases the average strength of a transformation toughened Al₂O₃/30 v/o ZrO₂ (2.5 v/o Y₂O₃) composite from 550 MPa (80,000 psi) to 930 MPa (135,000 psi).

DESCRIPTORS: (U) *Ceramic materials, *Sintering,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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*Strength(Mechanics). Fractography, Fracture(Mechanics), Reaction kinetics, Isostatic pressing, Cracks, Voids, Density, Stress strain relations, Agglomerates, Mathematical models, Equations, Structural analysis, Aluminum, Oxygen, Zirconium, Microstructure, Defects(Materials), Surface active substances, Powder metallurgy

IDENTIFIERS: (U) PE81102F, WJAFOSR2308A2

AD-A144 279 11/8 20/11

CARNEGIE MELLON UNIV PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING AND MATERIALS SCIENCE

(U) Stress Corrosion Cracking of Wrought and P/M High Strength Aluminum Alloys.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 83.

MAR 84 12P

PERSONAL AUTHORS: Thompson, A. W. ; Bernstein, I. M. ;

REPORT NO. CMU-AFOSR-AL-7

CONTRACT NO. AFOSR-81-0041

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-84-0813

UNCLASSIFIED REPORT

ABSTRACT: (U) The combined results of the first three years of the program are presented, with emphasis on the stress corrosion cracking and hydrogen embrittlement of the PM 7090 Al alloy. Additional results on 7075 are also given. In particular, the role of temper and loading mode in susceptibility were examined for three test methods---time to failure of notched round bar specimens in a brine solution; straining electrode tests on notched round specimens under cathodic charging; and tensile tests on hydrogen pre-charged notched round specimens. These tests form the basis for an extensive, completed Ph.D. thesis which is summarized here. Stress corrosion testing has also been conducted on 7075 in aluminum chloride solutions and on HP 7075. We remain confident that we have established the basis and a good portion of the results necessary to understand, predict and model the role of hydrogen in stress corrosion cracking of high-strength aluminum alloys.

DESCRIPTORS: (U) *Aluminum alloys, *Stress corrosion, *Cracks, High strength alloys, Powder metallurgy, Hydrogen embrittlement, Loads(Forces), Cracking(Fracturing), Strain(Mechanics), Aging(Materials), Tensile strength, Electrodes, Tensile testers

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STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

IDENTIFIERS: (U) Aluminum alloy 7090, WUAFOSR2308A1,
PE81102F

(U) A 15 Nb-Sn Tunnel Junction Fabrication and Properties,

MAY 84 12P

PERSONAL AUTHORS: Rudman, D. A. ; Hellman, F. ; Hammond, R. H.
; Beasley, M. R. ;

REPORT NO. GL-3670

CONTRACT NO. F48820-82-C-0014

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-84-0829

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v55
n10 p3544-3553, 15 May 84.

Reprint: A 15 Nb-Sn Tunnel Junction Fabrication and
Properties.

DESCRIPTORS: (U) *Tunneling(Electronics),
*Superconductors, *Junctions, *Niobium alloys, *Tin
alloys, Electron beams, Deposition, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2301A8

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AD-A144 239 12/1 20/8

AD-A144 238 20/3 20/12

NEW MEXICO UNIV ALBUQUERQUE DEPT OF MATHEMATICS AND STATISTICS

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Migrant Program. A Differential Geometric Approach to Electromagnetic Lens Design.

(U) NbZr Multilayers. I. Structure and Superconductivity.

DESCRIPTIVE NOTE: Final rept. 16 May 83-15 May 84.

MAY 84 10P

PERSONAL AUTHORS: Lowe, W. P.; Geballe, T. H.;

JUN 84 5P

REPORT NO. GL-3887

PERSONAL AUTHORS: Stone, A. P.;

CONTRACT NO. F49820-82-C-0014

REPORT NO. NOTE-282

PROJECT NO. 2301

CONTRACT NO. AFOSR-83-0040

TASK NO. A8

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0828

TASK NO. D8

MONITOR: AFOSR
TR-84-0598

UNCLASSIFIED REPORT

ABSTRACT: (U) The problems investigated under this migrant arose in the author's research on electromagnetic (EM) lens design. This research was concerned with an EM lens design technique developed by C. E. Baum for transitioning TEM waves between cylindrical and conical transmission lines.

DESCRIPTORS: (U) *Experimental design, *Lenses, *Electromagnetism, *Geometry, Approach, Maxwell's equations, Shape, Parameters, Transmission lines

IDENTIFIERS: (U) *Electromagnetic lens, PE81102F, WUAFOSR2304D9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v29, n9 p4981-4988, 1 May 84.

Reprint: NbZr Multilayers. I. Structure and Superconductivity.

DESCRIPTORS: (U) *Superconductors, *Sputtering, Crystal structure, Niobium alloys, Zirconium alloys, Layers, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2301A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 225 12/1 20/11

NORTHWESTERN UNIV EVANSTON IL

(U) Markov Processes Applied to Control, Replacement, and Signal Analysis.

DESCRIPTIVE NOTE: Interim rept. 1 Jun-31 Dec 83.

MAY 84 8P

PERSONAL AUTHORS: Cinlar, E. ;

CONTRACT NO. AFOSR-82-0189

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0591

UNCLASSIFIED REPORT

ABSTRACT: (U) Research was performed during this period in four separate areas: Deformation of Solids and Stochastic Flows; Self-Exciting Point Processes; Stability of Dependent Random Variables; and Brownian Motion on Manifolds. This report summarizes progress in these areas. (Author)

DESCRIPTORS: (U) *Markov processes, *Microcracking, *Mathematical models, Research management, Continuum mechanics, Deformation, Solids, Flow, Excitation, Points(Mathematics), Random variables, Brownian motion, Nucleation, Control, Replacement, Signals

AD-A144 217 12/1

CALIFORNIA UNIV LOS ANGELES DEPT OF MATHEMATICS

(U) Spline and Weighted Random Directions Method for Nonlinear Optimization.

DESCRIPTIVE NOTE: Technical rept.,

84 15P

PERSONAL AUTHORS: Milstein, J. ;

CONTRACT NO. AFOSR-80-0243

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-84-0592

UNCLASSIFIED REPORT

ABSTRACT: (U) This article considers the problem of determining the optimal value and corresponding optimal point of a real function F in M variables. Only function values are given and the computation of derivatives is either not practical or are not available. Bremermann introduced an ingenious and useful optimization algorithm that is guaranteed to converge for polynomials in several variables up to fourth degree. The heart of this method is the use of random directions of search together with a Lagrangian interpolation scheme. This author, having had extensive experience with this algorithm, found that the method has fast convergence at the early stages and tends to stagnate in the neighborhood of the optimal point. Motivated by the usefulness of random directions it is the purpose of this article to present an algorithm based on the proper use of interpolation schemes: (a) Lagrangian interpolations (such as those in Bremermann's methods); (b) spline approximations with variable nodes; (c) pseudo Newton steps using the spline derivatives (not the function); together with a search procedure along weighted random directions. The directions are chosen to be orthogonal using the Gram Schmidt orthogonalization procedure. This algorithm was extensively used for problem solving in mathematical biology, chemical kinetics, and general dynamical systems.

DESCRIPTORS: (U) *Lagrangian functions, *Variables,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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Algorithms, Interpolation, Optimization, Value, Vector analysis, Problem solving, Nonlinear systems, Polynomials, Reaction kinetics, Biology

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A3

AD-A144 218 20/3 9/2

KENTUCKY UNIV RESEARCH FOUNDATION LEXINGTON

(U) Harmonic Control to Reduce Torque Pulsations in Brushless DC Motor Drives.

DESCRIPTIVE NOTE: Final rept. May 83-Jan 84,

MAR 84 145P

PERSONAL AUTHORS: Cathey, J. J. ;

CONTRACT NO. AFOSR-83-0189

PROJECT NO. 2305

TASK NO. D9

MONITOR: AFOSR
TR-84-0807

UNCLASSIFIED REPORT

ABSTRACT: (U) The brushless direct current (DC) machine theoretically offers wide speed range torque characteristics like unto the commutator DC machine. However, in brushless DC motor drive systems there exists a performance deficiency in that at near zero speeds driven mechanical loads can respond to the pulsating component of developed torque when simple rotor position-activated switching is utilized. This report analytically develops a pulse width modulation control philosophy that reduces torque pulsations to an acceptable level. (Author)

DESCRIPTORS: (U) *Brushless electric equipment, *Torque, *Control systems, *Pulse position modulation, *Computer programs, Direct current, Motors, Reduction, Deficiencies, Phase modulation, Air Force research

IDENTIFIERS: (U) *Torque pulsations, Cycloconverter drives, Harmonic control, PE81102F, WUAFOSR2305D9

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DTIC REPORT BIBLIOGRAPHY

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STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

SOLAR TURBINES INC SAN DIEGO CA

(U) A Unified Theory for Elastic Wave Propagation in Polycrystalline Materials.

(U) Erosion Mechanisms of Metals.

DESCRIPTIVE NOTE: Interim rept. Jul 82-Jul 83.

DESCRIPTIVE NOTE: Final rept. Jul 78-Aug 83.

MAR 84 19P

MAR 84 108P

PERSONAL AUTHORS: Stanke, F. E.; Kino, G. S.;

PERSONAL AUTHORS: Gulden, M. E.; Kubarych, K. G.;

REPORT NO. GL-3595

REPORT NO. SR84-R-4528-03

CONTRACT NO. F49620-79-C-0217

CONTRACT NO. F49620-78-C-0104

PROJECT NO. 2308

PROJECT NO. 2308

TASK NO. A2

TASK NO. A2

MONITOR: AFOSR
TR-84-0831MONITOR: AFOSR
TR-84-0833

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Acoustical Society of America, v75 n3 p885-881 Mar 84.

ABSTRACT: (U) This final report summarizes the experimental approach was to initially study a single alloy which exhibits a transition from brittle to ductile type erosion response at room temperature. At a later stage, the dynamic hardness of several substrate materials, both pure metals and alloys, was measured in order to provide a material property obtained under dynamic conditions similar to those during an actual erosion event. The results can be conveniently separated into two phases as follows: Erosion Material Removal Mechanisms, and Correlation Between Dynamic Hardness and Erosion.

Reprint: A Unified Theory for Elastic Wave Propagation in Polycrystalline Materials.

DESCRIPTORS: (U) *Elastic waves, *Acoustic waves, *Wave propagation, Theory, Polycrystalline, Attenuation, Acoustic attenuation, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2

DESCRIPTORS: (U) *Metals, *Carbon steels, *Erosion, Fracture(Mechanics), *Brittleness, Microstructure, Strain rate, Stress strain relations, Plastic deformation, Hardness, Ductility, Melting point, Mechanical properties, Heat treatment, Substrates, Aluminum alloys, Copper, Gold, Molybdenum alloys, Particle size

IDENTIFIERS: (U) Aluminum 2024, Steel 1095,
WUAFOSR2308A2, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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AD-A144 184 12/1 8/1

LA JOLLA INST CA

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF MATHEMATICS

(U) Low-Energy Collisions Excited Atoms.

(U) Mathematical Biology, Models and Algorithms.

DESCRIPTIVE NOTE: Final rept. 1 May 82-30 Apr 84.

83 9P

JUN 84 11P

PERSONAL AUTHORS: Milstein, J. ;

PERSONAL AUTHORS: Neynaber, R. H. ; Tang, S. Y. ;

CONTRACT NO. AFOSR-80-0243

CONTRACT NO. F49820-82-K-0023

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A3

TASK NO. A4

MONITOR: AFOSR

TR-84-0594

MONITOR: AFOSR

TR-84-0620

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The report describes molecular-beam studies of ion-pair production, charge transfer, and measurements of the fraction of excited Na atoms in a composite beam of ground-state and excited Na atoms. Some of the experiments involved laser excited Na as a reactant. Included are investigations of the Na-Br, doubly charged Ar-Ar, Ne ion-metastable He, excited Na-Na, and Li-Na systems.

DESCRIPTORS: (U) *Collisions, *Excitation, *Atoms, *Low energy, Lasers, Charge transfer, Molecular beams, Pair production, Ions, Sodium, Argon, Lithium, Neon, Bromine

SUPPLEMENTARY NOTE: Pub. in Modelling and Data Analysis in Biotechnology and Medical Engineering, p73-78 1983.

Reprint: Mathematical Biology, Models and Algorithms.

DESCRIPTORS: (U) *Mathematical models, *Mathematical analysis, *Algorithms, Biology, Kinetics, Vector analysis, Parameters, Predictions, Standardization, Reprints

IDENTIFIERS: (U) *Mathematical biology, WUAFOSR2304A3, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO8F

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CALIFORNIA UNIV LOS ANGELES DEPT OF SYSTEM SCIENCE

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Sequential Decision Models in Reliability.

(U) Electrode Reactions of Oriented Chemisorbed Molecules.
The Effect of Temperature on Reversible Redox,
Irreversible Oxidation, and Reductive Desulfurization.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 82-30 Sep 83.

JUN 84 5P

83 17P

PERSONAL AUTHORS: MILLER, B. L. ;

PERSONAL AUTHORS: Sorlaga, M. P. ; Hubbard, A. T. ;

CONTRACT NO. AFOSR-82-0305

CONTRACT NO. AFOSR-81-0149

PROJECT NO. 2304

PROJECT NO. 2303

TASK NO. A6

TASK NO. A1

MONITOR: AFOSR
TR-84-0590MONITOR: AFOSR
TR-84-0319

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Investigators studied the problem of the order in which to inspect a system to determine its state and the cause of its possible failure. Results to date are for a series system, and k types of inspections, k 1. This generalizes the direct search results of Matula and Stone where k is fixed at 1. The model also allows multiple inspections in the same period. (Author)

SUPPLEMENTARY NOTE: Pub. in Jnl. of Electroanal Chemistry, v159 p101-116 1983.

Reprint: Electrode Reactions of Oriented Chemisorbed Molecules. The Effect of Temperature on Reversible Redox, Irreversible Oxidation, and Reductive Desulfurization.

DESCRIPTORS: (U) *Mathematical models, *Systems analysis, *Reliability, Searching, Decision making, Failure, Sequences, Bayes theorem

DESCRIPTORS: (U) *Electrochemistry, Chemical reactions, Electrodes, Chemisorption, Orientation(Direction), Temperature, Aromatic compounds, Reprints

IDENTIFIERS: (U) WUAFOSR2304A6, PEB1102F

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION
INC ST CLOUD FL

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subsequently encountered in transferring funds and authorizing travel to technical meetings. This caused some distress among the Scholars. However, overall, the Scholars felt their experience at the Laboratory were constructive steps in their professional development.
(Author)

(U) United States Air Force Geophysics Scholar Program,
1982-1983.

DESCRIPTIVE NOTE: Management and technical rept..

MAR 84 252P

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Stair, A. T. ;

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2301

TASK NO. DS

MONITOR: AFOSR
TR-84-0822

DESCRIPTORS: (U) *Research management, *Geophysics,
*Laboratories, *Education, Students, Universities, Pilot
studies

IDENTIFIERS: (U) PEB1102F, WJAFOSR2301D5

UNCLASSIFIED REPORT

ABSTRACT: (U) The Geophysics Scholar Program was initiated as a pilot program to provide new Research Scholars with one year appointments to the Air Force Geophysics Laboratory. Extensive mailings were made to technical departments at universities around the United States where programs of prime interest to the Geophysics Laboratory were established. These included Atmospheric Studies, Geophysics, Meteorology and related applied sciences. Ten Scholars were appointed beginning in September 1982 and extending through December 1982, for 12 months duration. Six of these were subsequently continued in the Geophysics Scholar Program under another contract for a second year. Five technical papers were presented by the Scholars during the year. The final technical reports on the Scholar's work are included in this report. This pilot program was judged to a success by both the Scholars and their Laboratory Associates. Their comments were solicited by questionnaire and are included. The Scholars were judged to be beneficial to the Laboratory. The opportunity of having new Research people on a short term basis was felt to be very stimulating and worth while. Their interaction with the Laboratory was very positive. At the initiation of this program, travel funds were provided only for travel to the Laboratory site at the state of the appointment and return funds at the end. Some difficulties were

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MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

NEW MEXICO UNIV ALBUQUERQUE DEPT OF MATHEMATICS AND STATISTICS

(U) White Light Optical Information Processing.

(U) An Anisotropic Lens for Launching TEM Waves on a Conducting Circular Conical System.

DESCRIPTIVE NOTE: Annual rept. no. 8, 15 Aug 82-30 Sep 83,

FEB 84 41P

JUN 84 84P

PERSONAL AUTHORS: Leith, E. N. ;

PERSONAL AUTHORS: Stone, A. P. ; Baum, C. E. ;

CONTRACT NO. AFOSR-81-0243

REPORT NO. NOTE-285

PROJECT NO. 2305

CONTRACT NO. AFOSR-83-0040

TASK NO. B1

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0808

MONITOR: AFOSR
TR-84-0800

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Methods for optical processing and holography with light of reduced coherence are described. Specifically described are: (a) a method for making holographic optical elements in light of reduced spatial coherence; (b) a method for doing real time phase conjugation in light of reduced spatial coherence; and (c) a method for doing off-axis Fourier transform holography in spatially incoherent light. (Author)

ABSTRACT: (U) A differential impedance and transit-time matching approach is used in the design of an anisotropic lens for launching TEM waves from a small source, through the lens, and onto a conducting circular conical system. This approach leads to a system of ordinary differential equations which may be solved exactly to obtain the lens parameters. An approximate solution, which would be applicable to a design procedure, is also given. (Author)

DESCRIPTORS: (U) *Optical processing, *Information processing, *White light, Fourier transformation, Holography, Signal to noise ratio, Coherence, Incoherence, Interferometry, Air Force research

DESCRIPTORS: (U) *Numerical methods and procedures, *Lenses, *Anisotropy, Circular, Conical bodies, Equations, Impedance matching, Launching, Geometry, Parameters, Solutions(General), Graphs, Tables(data)

IDENTIFIERS: (U) PE81102F, WJAFOSR230581

IDENTIFIERS: (U) *TEM waves, *Electromagnetic lenses, PE81102F, WJAFOSR230409

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DTIC REPORT BIBLIOGRAPHY

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MASSACHUSETTS INST OF TECH CAMBRIDGE FRANCIS BITTER
NATIONAL MAGNET LAB

BATTELLE COLUMBUS LABS OH

(U) Synthesis and Characterization of Superconducting
Electronic Materials.

(U) Hot Isostatic Pressing of Ceramic Powder Compacts.

DESCRIPTIVE NOTE: Rept. no. 2, Jun 83-Jun 84,

DESCRIPTIVE NOTE: Semiannual technical rept. 1 Jul-31 Dec
83,

JUN 84 71P

FEB 84 9P

PERSONAL AUTHORS: McCoy, J. K. ; Willis, R. R. ;

PERSONAL AUTHORS: Meservey, R. H. ; Tedrow, P. M. ; Orlando, T.
P. ;

CONTRACT NO. AFOSR-82-0238

PROJECT NO. 2308

CONTRACT NO. F49620-82-K-0028

TASK NO. B2

PROJECT NO. 2308

MONITOR: AFOSR

TR-84-0617

TASK NO. C1

MONITOR: AFOSR

TR-84-0630

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Films of VN as thin as 5 nm have been made by nitriding V films at high temperature. Tunnel junctions have been successfully made using both oxidized and nitrided amorphous Si barriers. Spin-polarized tunneling results show VN to have a small spin-orbit interaction, but larger than Al. Tunnel junctions have been successfully made on V3Ga and spin-polarized tunneling shows spin splitting up to 20 Teslas. Structure and compositional analysis of the V3Ga films has been carried out. We have successfully made high transition temperature Nb films as thin as 5 nm.

DESCRIPTORS: (U) *Superconductors, *Nitrides, *Vanadium compounds, Synthesis(Chemistry), Thin films, High temperature, Tunneling(Electronics), Junctions, Silicon, Molecular orbitals, Spinning(Motion), Orbits

IDENTIFIERS: (U) PE81102F, WJAFORSE2308C1

ABSTRACT: (U) The effect of temperature, pressure and time on the rate of densification of submicron alumina powder during hot isostatic pressing has been determined using a dilatometer to continuously monitor volumetric changes. A Fortran computer program is used to make corrections for thermal expansion of the alumina and the stainless steel can, to determine the relative density of the alumina compact at any point, and to produce report ready graphs depicting the relationship between any two prescribed variables. Analysis of other errors associated with the use of the dilatometer shows that these are negligible compared with thermal expansion effects. The rate of densification is controlled by an interface reaction mechanism never previously observed in the densification of alumina. Mass transport is limited by the movement of grain boundary dislocations which act as sites for atoms to detach from grains. The actual rate limiting process is the diffusion of solute in the lattice since the motion of solute atoms can result in a large number of atoms being freed from a grain boundary dislocation. Once separated from the dislocation the atoms quickly diffuse away.

DESCRIPTORS: (U) *Ceramic materials, *Isostatic pressing, *Packing density, Powders, Aluminum oxides, Stainless steel, Hot pressing, Diffusion coefficient, Porosity, Grain size, Dislocations, Physical properties, Mechanical properties, Thermal expansion, Algorithms, Mathematical

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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models, Theory, Test methods, Computer programs,
Variables, Interfaces, Graphs

CLARKSON COLL OF TECHNOLOGY POTSDAM N Y DEPT OF PHYSICS
(U) Advanced Studies of Integrable Systems.

IDENTIFIERS: (U) PEB1102F, WUAFOSR2308B2

DESCRIPTIVE NOTE: Interim rept., 8 Jan 83-31 May 84,

JUN 84 25P

PERSONAL AUTHORS: Kaup, D. J. ;

CONTRACT NO. AFOSR-82-0154

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-84-0593

UNCLASSIFIED REPORT

ABSTRACT: (U) A scientific report is presented covering publications resulting from a one year study of advanced topics in integrable systems. These publications cover studies on: Soliton Dynamics in the Pressure of External Forces; Nonlinear Scattering of Whistlers by Electro-Static Fluctuations; The Force Toda Lattice: An example of an almost integrable system; The Soliton Birth Rate in the Forced Toda Lattice; and Whistler Scattering From Density Fluctuations in Magnetized Plasmas. (Author)

DESCRIPTORS: (U) *Integrated systems, *Physics,
Whistlers, Scattering, Nonlinear systems, Electrostatics,
Magnetization, Plasmas(Physics), Density, Variations

IDENTIFIERS: (U) Solitons, PEB1102F, WUAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLO8F

AD-A144 121 12/1

LA JOLLA INST CA CENTER FOR THE STUDY OF NONLINEAR DYNAMICS

(U) The Analytic Structure of Ordinary and Partial Differential Equation.

DESCRIPTIVE NOTE: Final rept. 1 Mar 83-28 Feb 84,

MAY 84 12P

PERSONAL AUTHORS: Weiss, J. ;

REPORT NO. LJI-R-84-281

CONTRACT NO. AFOSR-83-0095

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-84-0599

UNCLASSIFIED REPORT

ABSTRACT: (U) Contents: The Sine-Gordon Equations; On Classes of Integrable Systems and the Painleve Property; The Painleve Property and Backlund Transformations for the Sequence of Bousinesq Equations; and Backlund Transformation and Linearizations of the Henon-Heiles System.

DESCRIPTORS: (U) *Partial differential equations, Numerical methods and procedures, Solutions(General), Transformations(Mathematics), Linearity, Air Force research

IDENTIFIERS: (U) Sine Gordon equations, Painleve property, Bousinesq equations, Backlund transformations, PE61102F, WJAFOSR2304A4

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AD-A144 097

AD-A144 097 12/1

SOUTHERN METHODIST UNIV DALLAS TX DEPT OF MATHEMATICS
(U) A Spline-Based Approximation Method for Inverse Problems for a Hyperbolic System Including Unknown Boundary Parameters.

DESCRIPTIVE NOTE: Interim rept.,

83 5P

PERSONAL AUTHORS: Murphy, K. A. ;

CONTRACT NO. AFOSR-81-0198

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-84-0618

UNCLASSIFIED REPORT

ABSTRACT: (U) Document discusses a method for the estimation of unknown parameters (variable as well as constant) occurring in a hyperbolic system, in the context of a seismic application. Presented are both theoretical results and some numerical (test) examples.

DESCRIPTORS: (U) *Numerical methods and procedures, *Algorithms, *Parametric analysis, *Approximation(Mathematics), Inversion, Estimates, Boundaries, Hyperbolas, Seismology, Convergence, Coefficients

IDENTIFIERS: (U) PE61102F, WJAFOSR2304A4

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AD-A144 098 20/5 13/8

AD-A144 058 9/1 20/12

BATTELLE COLUMBUS LABS OH

ROSE-HULMAN INST OF TECH TERRE HAUTE IN

(U) Three-Dimensional Photochemical Machining with Lasers.

(U) Gallium Arsenide Field-Effect Transistor Magnetic Field Studies.

DESCRIPTIVE NOTE: Semi-Annual technical rept. no. 1, 1
Aug 82-31 Jan83,

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 84,

DEC 83 6P

JUN 84 13P

PERSONAL AUTHORS: Schwerzel, R. E. ;

PERSONAL AUTHORS: Moloney, M. J. ;

CONTRACT NO. F49620-82-C-0077

CONTRACT NO. AFOSR-83-0133

PROJECT NO. 2306

PROJECT NO. 2306

TASK NO. B2

TASK NO. D9

MONITOR: AFOSR
TR-84-0615MONITOR: AFOSR
TR-84-0625

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Research on the development of new photoinitiator systems for spatially selective photochemical machining with lasers has continued smoothly and is progressing well. The porphyrin system developed during the first quarter continues to look particularly promising. A number of potential new candidate materials have also been identified, including a rubrene sulfonyl chloride derivative. Experimental study of these new compounds was begun during the past quarter and is expected to continue for several more months to define materials properties and optical parameters have been carried out to guide this effort. (Author)

DESCRIPTORS: (U) *Lasers, *Machining, Photochemical reactions, Three dimensional, Porphyrins, Rubrenes, Chlorides, Sulfonyl halides, Optics, Parameters

IDENTIFIERS: (U) PE81102F, WUAFOSR230682

ABSTRACT: (U) This Minigrant work followed the author's effort in the 1982 Summer Faculty Research Program at WPAFB developing a prototype GaAs FET computer model. During the Minigrant work, the computer model was developed, tested and run extensively. Development included using true GaAs velocity overshoot correctly in the model, greatly increasing model speed, evolving an improved way to handle carrier transport, studying conduction through the semi-insulating substrate, handling individual cell doping and mobility, testing the model for valid capacitance calculations, testing the model for Gunn oscillations in a diode configuration (and obtaining good results), and use of rectangular cells rather than the original square ones. (Author)

DESCRIPTORS: (U) *Field effect transistors, *Gallium arsenides, Computerized simulation, Charge carriers, Transport properties, Gunn diodes, Substrates, Configurations, Cells, Insulation, Gels

IDENTIFIERS: (U) Rectangular areas, WUAFOSR2306D9, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A144 057 20/8 12/1

MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY

(U) New Method in Elementary Particle Detection.

DESCRIPTIVE NOTE: Final rept..

JUN 84 45P

PERSONAL AUTHORS: Weber, J. ;

CONTRACT NO. F49620-83-C-0095, ARPA Order-4099

MONITOR: AFOSR
TR-84-0819

UNCLASSIFIED REPORT

ABSTRACT: (U) Theory is given for momentum transfer to an ensemble of particles by incident neutrinos or antineutrinos, in such a way that subsequent measurements cannot reveal the detailed characteristics of this transfer. It is shown that large scattering cross sections may be obtained, proportional to the square of the number of scatterers. Experiments are described for observations at energies of about 12 kilovolts and in the one million electron volt region.

DESCRIPTORS: (U) *Elementary particles, *Coherent scattering, *Numerical methods and procedures, Scattering cross sections, Detection, Momentum transfer, Neutrinos, Low energy, Current density, Interactions

IDENTIFIERS: (U) *Elementary particle detection

AD-A144 057

AD-A144 054 12/1

CALIFORNIA UNIV SANTA BARBARA

(U) Products of Elementary Doubly Stochastic Matrices,

84 12P

PERSONAL AUTHORS: Marcus, M. ; Kidman, K. ; Sandy, M. ;

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-84-0801

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Linear and Multilinear Algebra, v15 p331-340 1984.

Reprint: Products of Elementary Doubly Stochastic Matrices.

DESCRIPTORS: (U) *Matrices(Mathematics), *Stochastic processes, Equations, Permutations, Reprints

IDENTIFIERS: (U) WUAFOSR2304A3, PEB1102F

AD-A144 054

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A144 053 20/5 20/8

MATHEMATICAL SCIENCES NORTHWEST INC BELLEVUE WA

(U) Tapered-Wiggler Free-Electron Laser Oscillator Program.

DESCRIPTIVE NOTE: Final rept.,

MAY 84 145P

PERSONAL AUTHORS: Slater, J. ; Grossman, W. ; Quimby, D. ;
Vetter, A. ; Wilcoxon, J. ;

REPORT NO. MSNW-C-11.198.01

CONTRACT NO. F49620-81-C-0079

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-84-0623

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this program is to provide data and analysis for assessing the potential of tapered-wiggler free-electron laser (FEL) oscillators as high-efficiency sources of coherent radiation. It is expected that the tapered-wiggler concept will lead to the development of high-efficiency FELs by providing substantial energy extraction in a single pass of the beam through the wiggler magnet. The work consists of parallel experimental and theory tasks.

DESCRIPTORS: (U) *Laser applications, *Oscillators, Coherent radiation, Diffraction, Sidebands, Stability, Suppression, Thin films, Mirrors, Coatings, Birefringence, Filters, Gratings(Spectra), Prisms(Optics)

IDENTIFIERS: (U) *Free electron lasers, *Laser oscillators, Tapered wigglers, WJAFOSR2301A1, PE81102F

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WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

(U) Automatic Step Sizes for the Fortified Descent Algorithms in Monotropic Programming.

DESCRIPTIVE NOTE: Technical progress rept.,

84 7P

PERSONAL AUTHORS: Rockafellar, R. T. ;

CONTRACT NO. F49620-82-K-0012

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0602

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming, p337-348 1984.

Reprint: Automatic Step Sizes for the Fortified Descent Algorithms in Monotropic Programming.

DESCRIPTORS: (U) *Linear programming, Sizes(Dimensions), Algorithms, Optimization, Reprints

IDENTIFIERS: (U) *Monotropic programming, PE81102F, WJAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY

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TEXAS TECH UNIV LUBBOCK OPTICAL SYSTEMS LAB

AD-A143 994 20/8 9/2

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Space-Variant Optical Systems.

(U) Optical Computing Research.

DESCRIPTIVE NOTE: Annual technical rept. 30 Sep 82-30 Sep 83,

DESCRIPTIVE NOTE: Annual technical rept. 18 Mar 83-17 May 84,

NOV 83 15P

JUN 84 40P

PERSONAL AUTHORS: Walkup, J. F. ; Krille, T. F. ;

PERSONAL AUTHORS: Goodman, J. W. ; Nazarathy, M. ; Cao, Q. ; Kostuk, R. ; Ochoa, E. ;

CONTRACT NO. AFOSR-79-0078

REPORT NO. ISL-L722-9

PROJECT NO. 2305

CONTRACT NO. AFOSR-83-0188

TASK NO. B1

PROJECT NO. 2305

MONITOR: AFOSR

TR-84-0809

TASK NO. B1

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0832

ABSTRACT: (U) Both analytical and experimental investigations of 2-D space-variant optical processing techniques have been conducted. The investigations have included (1) the fabrication and quality testing of binary phase masks for multiplex holography; (2) a study of various techniques for using 1-D processors to perform 2-D processing and (3) a study of techniques for space-variant numerical optical processing. (Author)

UNCLASSIFIED REPORT

ABSTRACT: (U) This document covers work on several different areas of optical computing, as well as some work on digital processing of images. The primary emphasis of the work is on applications of optics to interconnections in the area of microelectronics. Other areas include diagonalization and inversion of circulant matrices, inversion of wavefronts using photorefractive crystals, suppression of speckle in coherently formed images, and data processing using dispersive anisotropic crystals. (Author)

DESCRIPTORS: (U) *Optical processing, *Holography, *Multiplexing, Holograms, Masks, Test methods, Computer applications, Two dimensional, One dimensional, White light, Map projection

IDENTIFIERS: (U) PEB1102F, WUAFOSR2305B1

DESCRIPTORS: (U) *Optical analysis, *Data processing, *Optical processing, Computations, Image processing, Microelectronics, Digital systems, Integrated circuits, Inversion, Wavefronts, Birefringence, Anisotropy, Crystals, Dispersions, Information processing, Air Force research

IDENTIFIERS: (U) Photorefraction, PEB1102F, WUAFOSR2305B1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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AD-A143 984

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CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS

CITY COLL NEW YORK DEPT OF ELECTRICAL ENGINEERING

(U) Characterization of Infrared Optical Properties of Transparent Materials.

(U) Optical Acquisition, Image and Data Compression.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Apr 83-31 Mar 84.

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 83-30 May 84.

MAY 84

34P

JUN 84

168P

PERSONAL AUTHORS: Braunstein, R. ;

PERSONAL AUTHORS: Eichmann, G. ;

CONTRACT NO. AFOSR-83-0189

REPORT NJ. 447104-1

PROJECT NO. 2306

CONTRACT NO. AFOSR-83-0081

TASK NO. B1

PROJECT NO. 2305

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0605

TR-84-0811

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The techniques of deep level derivative absorption spectroscopy (DLDA), photoinduced-transients-spectroscopy (P.I.T.S.) were employed to study deep levels and interfaces in Ga As. Optical transitions due to impurities and structural imperfections were observed by (DLDA) which can be correlated with levels observed by (P.I.T.S.). Raman measurements were used to study changes in the surface depletion layer width of Ga As as a result of oxidizing and reducing plasma treatments; in addition, the local strain in Ga As due to various thicknesses of silicon nitride were studied by observing the shift of the LO phonon frequency. (Author)

DESCRIPTORS: (U) *Transparence, *Infrared phenomena, *Optical properties, *Materials, Gallium arsenides, Silicon nitrides, Spectroscopy, Transients, Raman spectra, Scattering, Phonons, Frequency, Transitions, Defects(Materials), Structural properties, Silicon nitrides

IDENTIFIERS: (U) Photoinduced transients, PE81102F, WUAFOSR2306B1

AD-A143 988

AD-A113 984

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EVL08F

ABSTRACT: (U) This report deals with the phase estimation of low-time-bandwidth product (TBP) signals. Phase and frequency of a signal is estimated for short observation time. The observation time or the spectral bandwidth is limited to the superresolving regime where the TBP is near unity. Two classes of signal estimation are presented. Superresolving frequency estimation is performed where the sinusoidal signals are buried in deep white Gaussian noise. Constrained optimization techniques, using linear programming are used to estimate the location of the spectral peaks of the sinusoidal signals. Time and frequency limited Hilbert transform analysis is used to reconstruct the phase from the amplitude, and the amplitude from the phase of a complex signal. In addition, three smoothing methods; a mathematical filtering method, a correction factor method, and a method of spectral partitioning, are used to improve the phase/amplitude estimate of the complex signal. (Author)

DESCRIPTORS: (U) *Optical detection, Data compression, Mathematical filters, Optical properties, Short range(Time), Linear programming, Time, Optimization, Acquisition, Observation, Frequency, Estimates, Corrections, Signals

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 984 CONTINUED

AD-A143 949 12/1

IDENTIFIERS: (U) Image compression, PE81102F,
WUAFOSR230581

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

(U) Directional Differentiability of the Optimal Value
Function in a Nonlinear Programming Problem,

84 15P

PERSONAL AUTHORS: Rockafellar, R. T. ;

CONTRACT NO. F49620-82-K-0012

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0803

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming
Studies, 21, 1984.

Reprint: Directional Differentiability of the Optimal
Value Function in a Nonlinear Programming Problem.

DESCRIPTORS: (U) *Nonlinear programming, Vector analysis,
Parameters, Optimization, Lagrangian functions, Reprints

IDENTIFIERS: (U) WUAFOSR2304A6, PE81102F

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AD-A143 937 12/1 5/2

ITT AEROSPACE/OPTICAL DIV FORT WAYNE IND

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Study in Spurious Sensitivity of Electronics.

(U) Analysis, Modeling and Control of Dynamical Systems.

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 Jan-31 Mar 84,

DESCRIPTIVE NOTE: Interim rept. 1 Oct 83-31 Mar 84,

MAR 84 8P

MAR 84 7P

PERSONAL AUTHORS: Yeager, D. M. ;

PERSONAL AUTHORS: Banks, H. T. ; Hale, J. K. ;

CONTRACT NO. F49620-83-C-0153

CONTRACT NO. AFOSR-81-0198

PROJECT NO. 2301

PROJECT NO. 2304

TASK NO. A7

TASK NO. A1

MONITOR: AFOSR
TR-84-0624

MONITOR: AFOSR
TR-84-0507

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) A measurement program in which a proton beam irradiates sensitive electro-optical sensors used in spacecraft systems has been prepared. The progress reported during this period includes device procurement and testing of photomultiplier tubes at the Los Alamos Meson Physics Facility. The micropulse structure of the LAMPF beam is ideal for measuring transient response of the photomultiplier tubes. Each tube was placed in the beam head on so that all parts were exposed and side on so that only the electron multiplier was irradiated.

DESCRIPTORS: (U) *Transients, *Sensitivity, *Spurious effects, *Proton beams, *Electron multipliers, Response, Physics laboratories, Exposure(General), Mesons, Spacecraft, Sides, Electrooptics, Electronics, Optical detectors, Measurement

IDENTIFIERS: (U) WUAFOSR2301A7, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 928

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BATTELLE COLUMBUS LABS OH

(U) Three-Dimensional Photochemical Machining With Lasers.

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 1 Jun 82-30 Jun 83.

NOV 83

92P

PERSONAL AUTHORS: Schwerzel, R. E. ;

CONTRACT NO. F49820-82-C-0077, ARPA Order-4522

MONITOR: AFOSR
TR-84-0587

UNCLASSIFIED REPORT

ABSTRACT: (U) Research on the development of new photoinitiator systems for spatially selective photochemical machining with lasers has continued smoothly and is progressing well. The porphyrin system developed during the first quarter continues to look particularly promising. A number of potential new candidate materials have also been identified, including a rubrene sulfonyl chloride derivative.

DESCRIPTORS: (U) *Lasers, *Machining, Photochemical reactions, Three dimensional, Fabrication, Shape, Investment casting, Polymers, Rubrenes, Sulfonyl halides, Chlorides

IDENTIFIERS: (U) PE81102F

AD-A143 902

12/1

9/2

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Pipelined Orthogonal Digital Lattice Filters.

DESCRIPTIVE NOTE: Technical rept..

MAR 84

5P

PERSONAL AUTHORS: Rao, S. K. ; Kallath, T. ;

CONTRACT NO. MDA903-79-C-0880, DAAG29-79-C-0215

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0518

UNCLASSIFIED REPORT

ABSTRACT: (U) An algorithm is presented for the design of systolic arrays that implement single-input single-output time-invariant digital filters. The algorithm is then specialized to the case where the realized array consists only of orthogonal rotational modules and delay elements interconnected in such a manner as to render the circuit pipelineable. (Author)

DESCRIPTORS: (U) *Algorithms, *Digital filters, *Computers, Arrays, Orthogonality, Pipelines, Transfer functions, Circuits, Matrices (Mathematics), Input output processing, Information systems

IDENTIFIERS: (U) PE81102F, WJAFGL2304A8

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AD-A143 902

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SEARCH CONTROL NO. EVL08F

AD-A143 861

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RANDOM APPLICATIONS INC MONTROSE CO

NEW MEXICO ENGINEERING RESEARCH INST ALBUQUERQUE

(U) Offset DPSK (Differential Phase-Shift Keying) and a Comparison of Conventional and Symmetric DPSK with Noise Correlation and Power Imbalance,

MAR 84 9P

PERSONAL AUTHORS: Pawula, R. F. ;

CONTRACT NO. F49620-83-C-0085

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0467

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Communications, VCOM-32 n3 p233-240 Mar 84.

Reprint: Offset DPSK (Differential Phase-Shift Keying) and a Comparison of Conventional and Symmetric DPSK with Noise Correlation and Power Imbalance.

DESCRIPTORS: (U) *Phase shift keyers, Noise, Correlation, Power, Comparison, Errors, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A6

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EVL08F

(U) Application of Signal Analysis and Pattern Recognition Procedures to Study Blast Induced Ground Motion.

DESCRIPTIVE NOTE: Annual scientific rept. Feb 83-Feb 84,

MAR 84 24P

PERSONAL AUTHORS: Carson, J. M. ;

REPORT NO. NMERI-TA7-27

CONTRACT NO. AFOSR-82-0102

PROJECT NO. 2307

TASK NO. C1

MONITOR: AFOSR
TR-84-0581

UNCLASSIFIED REPORT

ABSTRACT: (U) The second-year results of an effort to introduce computer automated signal analysis and pattern recognition procedures to the study of blast-induced ground motion is presented. Intermediate results involving the characterization of ground motion acceleration records to identify ground spall versus no spall regions is reported. A computerized procedure extracted information from the time, frequency, and cepstrum description of the signal. These signal features were then incorporated into a Fisher's Linear Discriminant (FLD) pattern recognition procedure. Procedures to identify good and bad features are reviewed. This identification seems to be required for the efficient and effective application of the FLD. (Author)

DESCRIPTORS: (U) *Blast, *Ground motion, *Pattern recognition, Signals, Cepstrum technique, Automation, Computer applications, Spallation

IDENTIFIERS: (U) Berms, PEB1102F, WUAFOSR2307C1

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AD-A143 729 CONTINUED

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

PE81102F, LPN-OSURF-783420/715927

(U) Motion and Stability of Saturated Soil Systems under Dynamic Loading.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Jan 84.

APR 84 12P

PERSONAL AUTHORS: Sandhu, R. S. ;

CONTRACT NO. AFOSR-83-0055

PROJECT NO. 2307

TASK NO. C1

MONITOR: AFOSR
TR-84-0579

UNCLASSIFIED REPORT

ABSTRACT: (U) Various theoretical models were examined in the light of recent developments in the theories of interacting continua. Computer programs were developed to implement the popular 'engineering' approach to liquefaction. Ghaboussi's incompatible finite element model was compared with higher order elements to select the best model based on accuracy and economy. Numerical performance of special finite elements to model line singularities that occur at free draining loaded surfaces just after application of the load was documented. Biot's theory of wave propagation in fluid-saturated media was implemented in a computer program following Ghaboussi and Wilson's procedures for linear elastic soils. The computer models were verified against available results in the literature on the subject and against theoretical solutions, for one-dimensional problems, based on Biot's theory. Work was started on setting up laboratory experiments for verification of the theory. Necessary equipment and instrumentation was acquired. (Author)

DESCRIPTORS: (U) *Liquefaction, *Soil dynamics, Dynamic loads, Elastic properties, Interactions, Computerized simulation, Dynamic response, Soils, Saturation, Drainage, Wave propagation, Linearity, Attenuation, Theory, Mathematical models, Finite element analysis

IDENTIFIERS: (U) Saturated soils, WJAFOSR2307C1.

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COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC SCIENCE

(U) Effects of Mountain Ranges on Mesoscale Systems Development.

DESCRIPTIVE NOTE: Annual scientific rept. 15 Apr 83-14 Apr 84.

MAY 84

361P

PERSONAL AUTHORS: Reiter, E. R.; Sheaffer, J. D.; Klitch, M. A.; McAnally, R. L.; Tucker, D. F.;

CONTRACT NO. AFOSR-82-0162

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR TR-84-0545

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Includes Appendices A-H.

ABSTRACT: (U) This report summarizes research accomplishments in five major task areas: (1) Data Bank Acquisition, Emphasizing Satellite Data Over the Western U.S. and China. (2) Synoptic Studies Associated with Severe Weather Events. Two events of vortex development over Tibet, with subsequent heavy rainfall and flooding along the eastern slopes of the plateau, were analyzed in detail for later comparisons with numerical model results. Analyses of data from the western United States revealed the existence of a pronounced monsoon circulation system, and of a diurnally varying plateau circulations system. Both systems have a profound effect on the development of mesoscale convective complexes (MCCs) over the western United States. (3) Numerical Modeling. A mesoscale numerical model was developed which has yielded excellent results over Tibet in two case studies of vortex development and heavy precipitation. A number of parameterization schemes, mainly concerned with surface energy fluxes, are now under investigation to allow improved model forecasts over the western United States.

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(4) Intercomparison of U.S. and P.R.C. Mesoscale Convective Complexes and Their Controlling Effects. Detailed heat budget computations for the atmosphere over Tibet revealed much lower values for the atmospheric heat source during the period May-August, 1979. (5) Field Measurement Program. Two sets of sophisticated instruments, measuring in detail the surface energy budget, are presently deployed, one in the mountains west of Fort Collins, the other in the Gobi Desert at the northern edge of the Plateau of Tibet.

DESCRIPTORS: (U) *Mountains, *Terrain, *Convection(Atmospheric), Atmosphere models, Weather modification, Data bases, Climate, Elevation, Upper atmosphere

IDENTIFIERS: (U) Mesoscale systems, PE61102F, WJAFOSR2310A1

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ROCKWELL INTERNATIONAL THOUSAND OAKS CA
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

resonators, Double pole resonators, Monolithic
oscillators, Multimode resonators, Phase noise

(U) Monolithic SAW Oscillators on Silicon.

DESCRIPTIVE NOTE: Final rept. 15 Sep 82-14 Sep 83.

APR 84 50P

PERSONAL AUTHORS: Motamedi, M. E. ; Kilcoyne, M. K. ;

REPORT NO. MRDC41125.1FR

CONTRACT NO. F49820-82-C-0094

PROJECT NO. 2308

TASK NO. B2

MONITOR: AFOSR
TR-84-0557

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report progress in development of a monolithic SAW silicon resonator is described. Specific studies and results in the areas of piezoelectric films for generation and detection of SAW are presented. A multi-mode SAW resonator using thin film ZnO on silicon was designed, fabricated and characterized. Methods were developed for a new technique of fabricating silicon SAW resonator cavity using orientational etching. It was concluded that this type of etching results in well-defined sidewall structures for reflector cavity element, producing a superior resonant performance with lower phase noise than conventional SAW resonators. Automated measurement equipment was employed to evaluate devices and confirm equivalent circuit models. Device performance very closely matched original circuit models showing excellent confirmation of design parameters. (Author)

DESCRIPTORS: (U) *Surface acoustic wave devices, *Silicon, *Oscillators, *Films, *Zinc oxides, piezoelectric materials, Monolithic structures(Electronics), Resonators, Cavities, Measuring instruments, Models, Noise, Resonance, Cavity resonators, Multimode, Etching, Low noise, Circuits

IDENTIFIERS: (U) Coupler reflectors, Single pole

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CALIFORNIA UNIV LOS ANGELES DEPT OF SYSTEM SCIENCE

NIELSEN ENGINEERING AND RESEARCH INC MOUNTAIN VIEW CA

(U) On the Stabilization of Diffusion Equations: Boundary Observation and Feedback.

(U) Research on Topics in Perturbation Methods, Transonic Flow Theory, Numerical Analysis and Adaptive Grid Generation.

APR 84 31P

PERSONAL AUTHORS: Nambu, T. ;

DESCRIPTIVE NOTE: Final rept. for 1 Apr 79-31 Jan 84.

CONTRACT NO. AFOSR-79-0053

APR 84 35P

PROJECT NO. 2304

PERSONAL AUTHORS: Nixon, D. ; Klopfer, G. H. ;

TASK NO. A8

REPORT NO. NEAR-TR-324

MONITOR: AFOSR

CONTRACT NO. F49620-79-C-0054

TR-84-0562

PROJECT NO. 2307

UNCLASSIFIED REPORT

TASK NO. A1

SUPPLEMENTARY NOTE: Pub. in Differential Equations, v52 n2 p204-233 Apr 84.

MONITOR: AFOSR
TR-84-0548

Reprint: On the Stabilization of Diffusion Equations: Boundary Observation and Feedback.

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *Differential equations, *Thermal diffusion, Control systems, Feedback, Stabilization, Reprints

ABSTRACT: (U) This report summarizes work performed during the period April 1, 1979 to January 31. The work is concerned with certain topics on perturbation theory, transonic flow theory, numerical analysis, and adaptive grid generation.

IDENTIFIERS: (U) *Heat equations, Diffusion equations, *UAFOSR2304A8, PE61102F

DESCRIPTORS: (U) *Research management, *Perturbation theory, *Numerical analysis, *Transonic flow, Grids, Adaptive systems, Mesh, Computations, Shock waves, Air Force research

IDENTIFIERS: (U) Adaptive grid generation

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MCDONNELL DOUGLAS RESEARCH LABS ST LOUIS MO

(U) Control of Jet Flowfield Dynamics.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan 83-1 Jan 84,

FEB 84 46P

PERSONAL AUTHORS: Kibens, V. ; Wlezielen, R. W. ;

REPORT NO. MDC-Q1214

CONTRACT NO. F49620-83-C-0048

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-84-0551

UNCLASSIFIED REPORT

ABSTRACT: (U) Passive control of shear layer turbulence was investigated experimentally for low subsonic velocity jets from circular nozzles by studying effects of modifying nozzle exit geometry. Indeterminate origin (I.O.) nozzles used, including slanted, stepped and crenelated exit geometries, were so designated because streamwise location of the nozzle lip varies with azimuthal position, unlike standard nozzles for which the entire termination is at the same streamwise location. Flow visualization and detailed hot-wire measurements were used to observe development and interaction of large-scale turbulent structures in shear layers originating from various sectors of the I.O. nozzles, to determine the influence of instability wave patterns on ensuing flowfield characteristics and to relate observed evolution of three-dimensional large-scale turbulent structures to global properties of the jet flowfield such as velocity profiles and shear layer spreading rates as a function of streamwise distance and azimuthal angle. Results showed pronounced asymmetries in shear layer growth rates, which could be controlled by varying nozzle parameters. The asymmetries were also confirmed by measurements of azimuthal variation of shear layer turbulent energy as well as mean-velocity profiles. Detailed features of energy transfer from the mean flow into successively

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larger flow structures were traced by spectral mapping techniques and by mapping energy levels contained in subharmonics of the shear-layer instability frequency at various azimuthal flow sectors.

DESCRIPTORS: (U) *Nozzles, *Jet flow, *Turbulence, *Boundary layer control, Passive systems, Flow fields, Structural properties, Nozzle gas flow, Subsonic flow, Shear properties, Interactions, Exits, Asymmetry, Geometric forms, Energy transfer, Energy levels, Mapping, Flow visualization, Rocket nozzles, Circular, Supersonic aircraft

IDENTIFIERS: (U) *Indeterminate origin nozzles, Asymmetric nozzles, Slanted nozzles, Stepped nozzles, Crenelated nozzles, Nozzle lips, Instability wave patterns, Nozzle exits, Circular nozzles, *Turbulence control, Shear layer instability, Passive control, WUAFOSR2307A2, PE61102F

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AD-A143 587 12/1 9/1

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER
ENGINEERING

ALPHATECH INC BURLINGTON MA

(U) White Light Optical Processing and Holography.

(U) Sensor Correlation and Data Fusion Theory.

DESCRIPTIVE NOTE: Annual rept. no. 5, 15 Aug 81-14 Aug 82.

DESCRIPTIVE NOTE: Final rept. 1 Apr 81-30 Jun 84,

OCT 82 43P

JUN 84 104P

PERSONAL AUTHORS: Leith, E. ;

PERSONAL AUTHORS: Sandell, N. R. , Jr.;

CONTRACT NO. AFOSR-81-0243

REPORT NO. TR-205

PROJECT NO. 2305

CONTRACT NO. F49620-81-C-0015

TASK NO. B1

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0434MONITOR: AFOSR
TR-84-0577

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Methods for doing optical processing, holography and phase conjugation in light of reduced coherence are described. Analysis shows that even with greatly reduced contrast, the signals recorded in incoherent light have a higher Signal to Noise Ratio than if the light were coherent. Experimental results are shown.

DESCRIPTORS: (U) *Optical processing, *Holography, White light, Fourier transformation, Optical interferometers, Image processing, Signal to noise ratio, Coherent optical radiation, Incoherence, Experimental data, Bias, Spectroscopy

IDENTIFIERS: (U) WUAFOSR2305B1, PEG1102F

ABSTRACT: (U) This report contains a summary of the results of the first two years, and the results obtained during the third year of research in the mathematical problems associated with the analysis and design of Air Force sensor correlation and data fusion systems. These systems play a vital role in the command and control process, but presently there exists no systematic and quantitative methodology for their analysis and design. In the first year of research ALPHATECH investigated an important subproblem: the distributed detection problem associated with determining the presence or absence of targets from a collection of distributed sensors. In the second year of research, ALPHATECH obtained novel exact expressions for the probability density function of the local log likelihood ratios used in distributed detection problems, and has used these expressions to generate an extensive set of design curves. In the third year of research, ALPHATECH investigated another important class of problems, namely, sequential distributed detection problems. Three such problems were formulated: the infinite horizon decentralized Wald problem; a decentralized Quickset Detection problem; and a sequential distributed detection problem with communication and ordered stopping times. The qualitative properties of the optimal solution for the decentralized Wald and the decentralized Wald problem and the

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sequential distributed detection problem with communication were obtained. (Author)

HUGHES RESEARCH LABS MALIBU CA

DESCRIPTORS: (U) *Numerical methods and procedures, *Detection, *Signal processing, Target detection, Gaussian noise, Correlation, Data processing, Command and control systems, Probability density functions, Optimization

(U) Investigation of Optical Fibers for Nonlinear Optics.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 83,

APR 84 45P

PERSONAL AUTHORS: DeShazer, L. G. ; Harrington, J. A. ; Pastor, A. C. ; Rand, S. C. ;

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A8

CONTRACT NO. F49620-82-C-0030

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-84-0574

UNCLASSIFIED REPORT

ABSTRACT: (U) The principal objective of this research program is to develop single crystal (SC) fibers for use in nonlinear optical devices. This encompasses measurement of physical and chemical properties of several candidate materials, fabrication of SC fibers, and investigation of nonlinear optical properties of report describes the successful fabrication of more than a half dozen single crystal fibers using new growth techniques and progress with hybrid fibers which show great promise for nonlinear optical applications. (Author)

DESCRIPTORS: (U) *Fiber optics, Nonlinear systems, Single crystals, Fibers, Optical equipment, Fabrication, Physical properties, Crystal growth

IDENTIFIERS: (U) *Nonlinear optics, PE81102F, WUAFOSR2301A1

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RENSELAER POLYTECHNIC INST TROY NY DEPT OF ELECTRICAL
COMPUTER AND SYSTEMS ENGINEERING

IDENTIFIERS: (U) PE61102F, WJAFOSR2306B2

(U) Non-Destructive Testing of Semiconductors Using
Surface Acoustic Wave.

DESCRIPTIVE NOTE: Final technical rept.,

DEC 83 274P

PERSONAL AUTHORS: Davari, B. ; Das, P. ;

CONTRACT NO. AFOSR-77-3426, AFOSR-82-0281

PROJECT NO. 2306

TASK NO. B2

MONITOR: AFOSR
TR-84-0582

UNCLASSIFIED REPORT

ABSTRACT: (U) The major emphasis of this report is on a new and novel surface acoustic wave (SAW) device which has been developed under this grant for use in the nondestructive determination of the electronic properties of semiconductors. The technique uses surface acoustic waves on a piezoelectric substrate. The electric field associated with the SAW interacts with free carriers of a semiconductor placed near the piezoelectric surface. The interaction generates detectable currents in the semiconductor and attenuates the SAW. By observing these effects while varying external parameters such as temperature, applied acoustic power, SAW frequency, semiconductor surface irradiation and bias voltage, the desired information is obtained. The properties that can be determined by this non contact technique include the bulk and surface conductivity, generation lifetime, surface recombination velocity, the location in the energy gap of traps, surface states, and interface states, trap emission and absorption times and storage times in the depletion layer.

DESCRIPTORS: (U) *Semiconductors, *Nondestructive testing, *Surface acoustic waves, Acoustics, Power, Conductivity, Surfaces, Electric fields, Energy gaps, Traps, Piezoelectric materials, Bias, Voltage, Depletion, Layers

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NORTHERN ILLINOIS UNIV DE KALB DEPT OF PHYSICS

temperature, Tin, Perovskites, Thin films

(U) Studies of Structural Properties and Their
Relationship to Critical Parameters in Superconducting
Materials.

IDENTIFIERS: (U) PE81102F, WJAFOSR2305B1

DESCRIPTIVE NOTE: Final rept. 1 Oct 79-31 Dec 83.

FEB 84 33P

PERSONAL AUTHORS: Kimball, C. W. ;

REPORT NO. 82-219

CONTRACT NO. AFOSR-80-0010

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-84-0550

UNCLASSIFIED REPORT

ABSTRACT: (U) The project comprised an experimental study of the electronic and vibrational properties of superconducting materials by means of Mossbauer spectroscopy. From the temperature dependence of the Mossbauer parameters of tin in the oxide superconductor Ba(Pb_{0.87}Sn_{0.03})BiO₃, phonon softening, characteristic of displacive transitions, was found to take place above the superconducting transition temperature. This observation is hence important for understanding the superconducting properties of the perovskite compounds. The Mossbauer effect at Sb121 in BaPb_{1-x}(Bi₁Sb_x)O₃ shows that Sb is 5+. The range of stability of the perovskite compounds was determined in the ternary systems Ba(Pb-Sn-Bi)O₃ and Ba(Pb-Sb-Bi)O₃. The composition dependence of the superconducting transition temperature was determined for both ternary systems. Conversion Electron Mossbauer Spectroscopy has been applied to the study of Nb₃Sn superconducting films. This total has been found to provide a unique probe of the electronic and vibrational properties of thin film materials.

DESCRIPTORS: (U) *Materials, *Superconductors,
*Structural Properties, Parameters, Electron spectroscopy,
Mossbauer effect, Vibration, Phonons, Transition

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

AD-A143 551 20/12

MASSACHUSETTS INST OF TECH CAMBRIDGE FRANCIS BITTER
NATIONAL MAGNET LAB

(U) Impurity and Defect Characterization in Epitaxial GaAs
InP and the Ternary and Quaternary Compound
Semiconductors.

DESCRIPTIVE NOTE: Final scientific rept. 1 Aug 78-31 Jul
83.

MAY 84 8P

PERSONAL AUTHORS: Button, K. J. ; Afsar, M. N. ;

CONTRACT NO. AFOSR-78-3708

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-84-0585

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimental techniques were developed and used for the unambiguous identification of donors in high-purity epitaxial GaAs, InP and related compounds. Magnetic fields up to 20 T and high-resolution submillimeter spectroscopy were used to distinguish the Zeeman transitions ($2p(m=1)$) of each different donor and to describe the dependence of the line shape on field intensity. Transmutation doping was used to distinguish Se and Ge donors, molecular beam epitaxy to distinguish Sn. These methods were extended to InGaAs near millimeter wavelengths. Finally, the magnetic field dependence of the spin doublet in GaAs was measured.

DESCRIPTORS: (U) *Semiconductors, *Defects (Materials), *Impurities, Epitaxial growth, Spectroscopy, Transitions, Identification, Electron donors, Gallium arsenides, Indium phosphides, Doping, Selenium, Germanium, Tin, Magnetic fields

IDENTIFIERS: (U) PE81102F, WUAFOSR2308B1

AD-A143 551

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AD-A143 547 9/2 9/5

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) Feedback Systems and Simultaneous Design.

DESCRIPTIVE NOTE: Final scientific rept. 1 Mar 81-15 Jul
83.

JUL 83 18P

PERSONAL AUTHORS: Saeks, R. ;

CONTRACT NO. AFOSR-82-0113

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0570

UNCLASSIFIED REPORT

ABSTRACT: (U) A family of analytic design techniques which can serve as a basis for a frequency domain approach to the computer-aided control system design problem are being developed. Specific projects include the development of multivariate frequency domain pole placement techniques, the formulation of techniques for incorporating domain pole placement techniques, the formulation of techniques for incorporating initial value constraints into the design problem, the extension of the theory of linear time-varying systems, and the development of simultaneous design algorithms. (Author)

DESCRIPTORS: (U) *Computer aided design, *Control systems, *Integrated circuits, Feedback, Multivariate analysis, Computer aided instruction, Algorithms

IDENTIFIERS: (U) Frequency domain, Domain pole placement techniques, PE81102F, WUAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A143 537 12/1

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

CALIFORNIA UNIV SANTA BARBARA ALGEBRA INST

(U) Laser Physics and Laser Techniques.

(U) Stability Analysis of Finite Difference Schemes for Hyperbolic Systems, and Problems in Applied and Computational Linear Algebra.

DESCRIPTIVE NOTE: Final technical rept. 1 Feb 82-31 Jan 84.

DESCRIPTIVE NOTE: Interim rept. 1 May 83-30 Apr 84.

APR 84 43P

JUN 84 23P

PERSONAL AUTHORS: Siegmán, A. E. ;

PERSONAL AUTHORS: Marcus, M. ; Goldberg, M. ;

REPORT NO. GL-3712

CONTRACT NO. F48820-82-K-0015

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2301

PROJECT NO. 2304

TASK NO. A1

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0572

TR-84-0587

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes research, journal publications, and conference presentations in the areas of picosecond optical pulses and picosecond spectroscopy; laser-induced surface transformations and spontaneous 'ripples'; tunable-laser-induced-grating spectroscopy; and optical phase conjugation and phase-conjugate resonators.

ABSTRACT: (U) The described efforts consist of the following projects: (a) Problems in stability analysis of finite difference approximations for hyperbolic initial-boundary value problems; (b) Matrix norms, condition numbers and the numerical solution of linear systems, and numerical range approximations. Such projects should contribute to better understanding of advanced computational techniques, and to the improvement of basic mathematical tools often used in numerical analysis and other fields of applied mathematics.

DESCRIPTORS: (U) *Lasers, *Laser applications, *Air Force research, Tunable lasers, Spectroscopy, Dye lasers, Laser damage, Ripples, Photoluminescence, Semiconductors, Electromagnetism

DESCRIPTORS: (U) *Finite difference theory, Boundary value problems, Stability, Linear algebraic equations, Mathematical models, Approximation(Mathematics), Eigenvalues, Numerical analysis

IDENTIFIERS: (U) WUAFOSR2301A1, PE811012F

IDENTIFIERS: (U) Hyperbolic systems, WUAFOSR2304A3, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A143 534

5/1 15/3

AD-A143 533 9/2

ILLINOIS UNIV AT CHICAGO CIRCLE

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Scientific Achievements and Activities.

(U) A Theory of Error-Based Testing.

DESCRIPTIVE NOTE: Interim rept. 1 Aug 82-31 Jul 83.

DESCRIPTIVE NOTE: Technical rept.,

83

13P

APR 84 88P

PERSONAL AUTHORS: Hedayat, A. S.; El-Newehi, E.;

PERSONAL AUTHORS: Morell, L. J.;

CONTRACT NO. AFOSR-80-0170

REPORT NO. TR-1395

PROJECT NO. 2304

CONTRACT NO. F49620-83-K-0018

TASK NO. A5

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0578

TASK NO. A7

MONITOR: AFOSR
TR-84-0583

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the scientific achievements and activities sponsored by the Air Force Office of Scientific Research under Grant AFOSR 80-0170 for the period August 1, 1982 - July 31, 1983. The report is divided into parts. Part I relates to the achievements and activities in the area of design of experiments and Part II relates to the achievements and activities in the area of reliability models. (Author)

UNCLASSIFIED REPORT

ABSTRACT: (U) Testing is the process of inferring the correctness of a program based on information collected during program execution. This process is called error-based when the information collected is used to infer that certain errors are not in a program. It is assumed here that a program can only be incorrect in a limited fashion specified by associating alternate expressions with program expressions. Substitution of an alternate expression for a program expression yields an alternate program that is potentially correct. The goal of error-based testing is to differentiate the program from each of its alternates. Two types of error-based testing are given. In static error-based testing the code is analyzed to produce two conditions. A creation condition describes when a class of alternate expressions will affect the program state. A propagation condition describes when an alternate program state will affect the output. If the output of the program is correct and both conditions are satisfied, all alternates are faults detected by the test set. In dynamic error-based testing information is first collected from test executions. It is then proved that certain alternate programs are eliminated. A particular form of dynamic error-based testing based on symbolic execution is presented. In symbolic testing program expressions are replaced by symbolic alternatives that represent classes of alternate expressions.

DESCRIPTORS: (U) *Air Force research, *Research management, *Reports, Experimental design, Reliability, Models, Statistical processes, Data acquisition

IDENTIFIERS: (U) WUAFOSR2304A5, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A143 532 9/2

UNIVERSITY OF SOUTHE' CALIFORNIA LOS ANGELES DEPT OF
COMPUTER SCIENCE

DESCRIPTORS: (U) *Test methods, *Computer program
verification, *Error analysis, Static tests, Dynamic
tests, Data acquisition, Corrections, Computations,
Theory

(U) Programming Productivity Enhancement by the Use of
Application Generators.

IDENTIFIERS: (U) Error based testing. WUAFOSR2304A7.
PE61102F

DESCRIPTIVE NOTE: Interim rept. 1 Jun 83-31 May 84.

JUN 84 5P

PERSONAL AUTHORS: Horowitz, E. ;

CONTRACT NO. AFOSR-82-0232

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-84-0575

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period, the investigators have
focused on how to increase the power of programming
languages for building man-computer dialogues. More
specifically they see such dialogues in terms of a
network of screens that might potentially be communicated
to the end user. Different screens of data are shown
depending on user responses. A programming language must
make it easy to specify a network of such screens,
describe the layout of any particular screen, and provide
editing capabilities, validity checking of inputs, and
scrolling capabilities. (Author)

DESCRIPTORS: (U) *Programming languages, *Computer
programming, *Man computer interface, Productivity, User
needs, Data bases, Management information systems,
Editing, Input

IDENTIFIERS: (U) *Application generators, WUAFOSR2304A2,
PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A143 529 CONTINUED

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION
RESEARCH

IDENTIFIERS: (U) WJAFOSR2304A2, PE81102F

(U) Simulation of Large Networks of Processors by Smaller
Ones.

DESCRIPTIVE NOTE: Technical rept.,

MAY 84 24P

PERSONAL AUTHORS: Bhaskar, S. K.; Rosenfeld, A.; Wu, A. Y.;

REPORT NO. CAR-TR-83, CS-TR-1401

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-84-0558

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with American
Univ., Washington, DC. Dept. of Statistics and Computer
Science.

ABSTRACT: (U) This paper considers the problem of
simulating a large network N of processors using a small
set of p processors. The approach taken is to partition
the nodes of N into p subsets $N_{sub 1}$ to $N_{sub p}$ and to
assign each subset to a processor for simulation. In
order to equalize the workloads of the processors, the
sizes of $N_{sub 1}$, $N_{sub p}$ should be as equal as possible;
and in order to minimize (and equalize) the amount of
message passing between the processors, the number of
pairs of nodes that are neighbors in N but belong to
different subsets should be as small (and as equal) as
possible. The authors discuss the general problem of
partitioning a graph N so as to satisfy these criteria,
and also consider the particular case of partitioning a
tree. (Author)

DESCRIPTORS: (U) *Algorithms, *Parallel processing,
*Simulation, *Networks, Multiprocessors, Nodes, Message
processing, Graphs, Trees

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION RESEARCH

(U) Degrees of Adjacency or Surroundedness.

DESCRIPTIVE NOTE: Technical rept..

MAR 84 33P

PERSONAL AUTHORS: Rosenfeld, A.; Klette, R.;

REPORT NO. CAR-TR-53, CS-TR-1380

CONTRACT NO. F49820-83-C-0082

PROJECT NO. 2304

TASK NO. K2

MONITOR: AFOSR
TR-84-0560

UNCLASSIFIED REPORT

ABSTRACT: (U) Definitions of the degree of adjacency of two regions in the plane, and the degree of surroundedness of one region by another, are proposed. Some elementary properties of these concepts are established, and it is also shown that they have natural generalizations to fuzzy subsets of the plane. Applications of the proposed measures to digital polygons are demonstrated and fast algorithms for computing these measures are given. (Author)

DESCRIPTORS: (U) *Plane geometry, *Pictures, *Computer graphics, Digital systems, Polygons, Algorithms, Computations, Edges

IDENTIFIERS: (U) *Adjacency, *Surroundedness, Pixels, Digital pictures, WUAFOSR2304K2, PE61102F

AD-A143 528

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AD-A143 527 12/1 9/2 9/5

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION RESEARCH

(U) Dynamic Programming and Transitive Closure on Linear Pipelines.

DESCRIPTIVE NOTE: Technical rept..

MAY 84 33P

PERSONAL AUTHORS: Ramakrishnan, I. V.; Varman, P. J.;

REPORT NO. CAR-TR-57, CS-TR-1388

CONTRACT NO. F49820-83-C-0082

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-84-0559

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rice Univ., Houston, TX. Dept. of Electrical Engineering.

ABSTRACT: (U) Algorithms for the dynamic programming and transitive closure problems are presented for a linear pipeline of processors. These algorithms require only a constant number of input/output ports and are optimal in their area and time requirements. (Author)

DESCRIPTORS: (U) *Algorithms, *Linear arrays, *Dynamic programming, Linear systems, Pipelines, Matrices(Mathematics), Computer architecture, Input output processing, Optimization

IDENTIFIERS: (U) Transitive closure, VLSI(Very Large Scale Integration), WUAFOSR2304A2, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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PITTSBURGH UNIV PA INST FOR COMPUTATIONAL MATHEMATICS AND APPLICATIONS

(U) Computational Fluid Dynamics at the ICMA (Institute of Computational Mathematics and Applications).

equations, Error analysis, Finite element analysis, Finite difference theory, Algorithms, Difference equations, Gas flow

IDENTIFIERS: (U) Computational fluid dynamics, PES1102F, WUAFOSR2304A3

DESCRIPTIVE NOTE: Final scientific rept. 1 Jun 80-31 May 84.

JUN 84 22P

PERSONAL AUTHORS: Hall, C.; Porsching, T.;

CONTRACT NO. AFOSR-80-0178

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-84-0588

UNCLASSIFIED REPORT

ABSTRACT: (U) This research concerned three independent projects of ICMA (Institute of Computational Mathematics and Applications) personnel, each belonging to the general area of computational fluid dynamics. The first project dealt with the computation of stationary Navier-Stokes solutions using continuation methods. Error estimates for certain finite element solutions of continuation problems were derived and extensions to more general operators including the Navier-Stokes operator were investigated. Numerical methods for the detection of Hopf bifurcation were studied. The second project involved construction, analysis and implementation of efficient computer algorithms for the finite difference and finite element-dual variable discretization of the two-dimensional Navier-Stokes problems. Particular attention was given to finite element and finite differences discretization such problems that arise in combustor modeling. The third project sought to extend the dual variable reduction technique to various fluid models. This required the construction of a network analogue for the discrete difference equations along with an analysis of the fundamental matrix and dual variable transformation involved. (Author)

DESCRIPTORS: (U) *Fluid dynamics, Navier Stokes

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLOS

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AD-A143 502 12/1 9/3

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MATHEMATICS

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) On the Finite Element Approximation of the Streamfunction-Vorticity Equations.

(U) Feedback System Design: the Pole Placement Problem.

84 11P

84 18P

PERSONAL AUTHORS: Gunzburger, M. D.; Peterson, J. S.;

PERSONAL AUTHORS: Iyer, A.; Saeks, R.;

CONTRACT NO. AFOSR-83-0101

CONTRACT NO. AFOSR-82-0113

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A3

TASK NO. A8

MONITOR: AFOSR
TR-84-0584

MONITOR: AFOSR
TR-84-0554

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Pittsburgh Univ., PA. Dept. of Mathematics and Statistics. Proceedings of the IMACS International Symposium on Computer Methods for Partial Differential Equations (5th).

SUPPLEMENTARY NOTE: Pub. in International Jnl. of Control, v38 n3 p455-472 1984.

ABSTRACT: (U) Finite element algorithms are presented for the approximate solution of the streamfunction-vorticity equations of steady incompressible viscous flows. Both the linear Stokes and the nonlinear Navier-Stokes equations are considered. The methods discussed require low continuity finite element spaces and do not require any artificial specification of the vorticity at solid boundaries. Particular attention is paid to methods for multiply connected domains and to theoretical and computational estimates for the accuracy of the algorithms. Brief consideration is also given to three dimensional problems, to exterior problems, and to the recovery of the pressure field. (Author)

DESCRIPTORS: (U) *Control systems, *Feedback, *Compensators, *Frequency, Polynomials, Input output models, Reprints

IDENTIFIERS: (U) Pole placement problem, PE81102F, WUAFOSR2304A8

DESCRIPTORS: (U) *Algorithms, *Finite element analysis, *Equations, *Steady flow, *Incompressible flow, *Viscous flow, Vortices, Solutions(General), Approximation(Mathematics), Accuracy, Navier stokes equations, Computations

IDENTIFIERS: (U) *Streamfunction vorticity equations, PE81102F, WUAFOSR2304A3

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AD-A143 502

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

MONTANA STATE UNIV BOZEMAN DEPT OF PHYSICS

(U) Symbolic Dynamics and Nonlinear Semiflows.

(U) Quantum Structure of Adsorbates on Semiconductor Surfaces.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-31 Dec 83,

MAY 84 49P

DEC 83 28P

PERSONAL AUTHORS: Hale, J. K.; Lin, X. B.;

PERSONAL AUTHORS: Lapeyre, Gerald J.;

REPORT NO. LCDS-84-8

CONTRACT NO. AFOSR-82-0287

PROJECT NO. DAAG29-83-K-0029, AFOSR-81-0198

TASK NO. B1

TASK NO. A1

PROJECT NO. 2308

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0588

TR-84-0584

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-MCS82-05355.

ABSTRACT: (U) For a transverse homoclinic orbit gamma of a map point (not necessarily invertible) on a Banach space, it is shown that the mapping restricted to orbits near gamma is equivalent to the shift automorphism on doubly infinite sequences of finitely many symbols. Implications of this result for the Poincare map of semiflows are given. (Author)

DESCRIPTORS: (U) *Mapping, *Nonlinear systems, *Orbits, Dynamics, Symbols, Flow, Banach space, Sequences(Mathematics), Trajectories, Topology, Infinite series

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A1

ABSTRACT: (U) Polarization-dependent angle-resolved photoemission spectroscopy with synchrotron radiation was performed on Ge adatom on GaAs(110) surfaced in the monolayer regime. Chemisorbed states at the gamma point in the Brillouin zone were observed about 8.8 eV below the valence band maximum. The states are attributed to chemisorption states that are precursors of Ge/GaAs heterojunction interface states which are theoretically predicted. A special low temperature UHV manipulator was constructed and used to perform oxygen and Co physisorption experiments on GaAs(110) at about 45 K.

DESCRIPTORS: (U) *Semiconductors, *Quantum theory, Structural properties, Emission spectroscopy, Chemisorption, Adsorption, Synchrotrons, Radiation, Surfaces, Gallium arsenides, Germanium, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2301B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 456 20/12

HUGHES RESEARCH LABS MALIBU CA

(U) Basic Problems in InP Technology.

DESCRIPTIVE NOTE: Final rept. 16 Nov 79-31 Mar 83,

MAR 84 74P

PERSONAL AUTHORS: Valdyanathan, K. V. ; Dunlap, H. L. ;

CONTRACT NO. F49620-82-C-0040

PROJECT NO. 2308

TASK NO. 81

MONITOR: AFOSR
TR-84-0583

UNCLASSIFIED REPORT

ABSTRACT: (U) Procedures for evaluating the thermal stability of bulk semi-insulating InP have been developed. Determination of the concentrations in semi insulating InP is a major analytical problem. Preliminary SIMS (secondary ion mass spectrometry) measurements show that significant redistribution of Fe can occur during high temperature processing. Severe degradation can occur in ion-implanted InP samples annealed with SiO₂ and encapsulated at temperatures of 750 C. The use of phosphosilicate glass dramatically reduces such surface degradation. Energy dispersive X-ray analysis (EDAX) shows that the loss of P at the surface is the cause of such degradation.

DESCRIPTORS: (U) *Semiconductors, *Indium phosphides, *Thermal stability, Mass spectrometry, Ion implantation, Doping, Annealing, Encapsulation, Thermal degradation, Glass

IDENTIFIERS: (U) Secondary ion mass spectrometry, Phosphosilicates, WUAFOSR2308B1, PE61102F

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AD-A143 449 20/5

DEACON RESEARCH SUNNYVALE CA

(U) Measurement of the Transverse Mode Excitation in the Stimulated Emission of the ACO Free Electron Laser.

DESCRIPTIVE NOTE: Final rept. 15 Sep-31 Dec 83,

MAR 84 81P

PERSONAL AUTHORS: Deacon, D. A. G. ;

REPORT NO. DR-3

CONTRACT NO. F49620-83-C-0149, ARPA Order-3923

PROJECT NO. 3923

TASK NO. 13

MONITOR: AFOSR
TR-84-0573

UNCLASSIFIED REPORT

ABSTRACT: (U) Measurements of the off-diagonal terms in the transverse gain matrix of the free electron laser were obtained and analyzed under this contract. Quantitative agreement was demonstrated with the low-diffraction theory. The scaling was demonstrated as a function of analysis distance, electron beam size, and resonance parameter. The effects of multiple mode input were observed, and a general analytic expression derived for this regime. (Author)

DESCRIPTORS: (U) *Lasers, *Free electrons, *Measurement, Scaling factors, Transverse, Excitation, Electron beams, Multimode, Input, Gain, Oscillation, Diffraction, Three dimensional

IDENTIFIERS: (U) *Free electron lasers, WUAFOSR392313, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F
AD-A143 426 11/8 7/4 CONTINUED

AUBURN UNIV AL

(U) Theory of the Electronic Properties of Mercury-Cadmium-Telluride Alloys.

IDENTIFIERS: (U) PE81102F. WJAFORSR2308C2

DESCRIPTIVE NOTE: Final rept. 31 Jun 81-31 Dec 83.

FEB 84 7P

PERSONAL AUTHORS: Chen, A. B.; Sher, A.;

CONTRACT NO. F49620-81-K-0012

PROJECT NO. 2308

TASK NO. C2

MONITOR: AFOSR
TR-84-0549

UNCLASSIFIED REPORT

ABSTRACT: (U) An accurate band-structure theory for semiconductor alloys was achieved. It has been successfully applied to Mercury-Cadmium-Telluride alloys (MCT), and is being extended to III-V and other II-VI semiconductor alloys. As a result of this research, ten papers have been published. Several other papers and one book are in progress. The most important finding was the origin of the major disorder and its effects on different parts of the band structure. The large s-energy fluctuation between the Hg and Cd sites was found to cause a large smearing of the density of states about 5 eV below the top of the valence band, but it produced very little bowing and scattering for the states near the band gap. A detailed study of these facts accounts for the lattice instability of MCT and its very high electron mobility. Another significant result is that, while Cd weakens a neighboring Hg-Te bond, Zn strengthens it. Such structural studies may help resolve the adverse structural difficulties affecting MCT as an infrared material.

DESCRIPTORS: (U) *Semiconductors, *Alloys, *Cadmium alloys, *Mercury alloys, *Tellurium alloys, *Structural properties, Electrical properties, Electron mobility, Infrared radiation, Materials, Group II-VI compounds, Group III compounds, Group V compounds, Dislocations, Valence bands

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLO8F

AD-A143 423 20/10 7/4

AD-A143 387 12/1

OREGON UNIV EUGENE DEPT OF PHYSICS

TENNESSEE TECHNOLOGICAL UNIV COOKEVILLE DEPT OF MATHEMATICS

(U) Relativistic Calculations and Measurements of Energies, Auger Rates, and Lifetimes.

(U) One-Sided R-Reliable Intervals and Their Associated Confidences on the Sum of Two Continuous/Independent, Random Variables.

DESCRIPTIVE NOTE: Final technical rept. 15 Jun 83-14 Feb 84.

FEB 84 15P

DESCRIPTIVE NOTE: Final rept. 8 Jun 83-5 Jun 84,

PERSONAL AUTHORS: Grasmann, B. ;

JUN 84 31P

CONTRACT NO. F49620-83-K-0020

PERSONAL AUTHORS: Patil, S. A. ;

MONITOR: AFOSR
TR-84-0571

CONTRACT NO. AFOSR-83-0250

PROJECT NO. 2304

TASK NO. D9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A130 094.

MONITOR: AFOSR
TR-84-0581

ABSTRACT: (U) This project is devoted to the study of the structure and dynamics of deep hole states in atoms and of few-electron systems. During the reporting period, work has been completed on the gauge dependence of atomic inner-shell transition rates, M x-ray emission rates in Dirac-Fock approximation, Auger and radiative deexcitation in P4+ ions, inelastic x-ray scattering cross sections of neon, on two book-length monographs on inner-shell processes, and on two reviews of atomic physics with synchrotron radiation. Threshold excitation phenomena in deep inner shells are being explored through gas-phase electron spectroscopy with synchrotron radiation, and investigations of the resonant Auger Raman effect and post-collision interaction are being pursued.

DESCRIPTORS: (U) *Relativity theory, *Quantum electrodynamics, *Holes(Electron deficiencies), Atomic structure, Auger electrons, Resonance, Excitation, Particle collisions, Spectrometry, Electron energy, Electronic states, X ray scattering, Synchrotrons, Atomic energy levels

AD-A143 423

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UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this proposal is to define and determine an R-reliable interval and its associated confidence on the sum of two continuous, independent, random variables with different scale parameters. The relationship between the confidence of the R-reliable interval on the sum and the confidences of the R-reliable intervals on the summand variables was also investigated. The confidence of the R-reliable interval on the sum was defined, and the largest order statistics were chosen which simplified the expression for the confidence of the R-reliable interval on the sum. The choice of the largest order statistics led to nonparametric results for the confidences of the R-reliable intervals on the summand variables. Exponential and folded normal continuous distributions were considered, and numerical values of the confidences associated with the R-reliable interval on the sum were obtained for selected sample sizes and selected ratios of the scale parameters. A distribution-free bound for the confidence of the R-reliable interval on the sum in terms of the confidence associated with the R-reliable intervals on the summand variables was obtained. The monotonicity of the confidence of the R-reliable interval on the sum was established for specific values of sample sizes. (Author)

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 387 CONTINUED

AD-A143 382 8/13

DESCRIPTORS: (U) *Confidence limits, *Intervals, *Random variables, Order statistics, Exponential functions, Normal distribution, Scalar functions, Parameters, Nonparametric statistics

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Special Finite Elements for Analysis of Soil Consolidation.

IDENTIFIERS: (U) WUAFOSR2304D9, PE81102F

DESCRIPTIVE NOTE: Geotechnical engineering rept. no. 9 (Annual).

AUG 83 83P

PERSONAL AUTHORS: Sandhu, R. S. ; Lee, S. C. ; The, H. I. ;

REPORT NO. OSURF-715107-83-2

CONTRACT NO. AFOSR-83-0055

PROJECT NO. 2307

TASK NO. C1

MONITOR: AFOSR
TR-84-0580

UNCLASSIFIED REPORT

ABSTRACT: (U) Use of singularity elements to model pore pressures in the vicinity of free-draining loaded surfaces, immediately after application of loads at these surfaces is discussed. One-dimensional consolidation is considered. Comparison of numerical results with the exact solution shows that use of specially designed elements approaching singularity may succeed in reducing the error in pore pressures. (Author)

DESCRIPTORS: (U) *Soil dynamics, *Finite element analysis, Spatial distribution, Interpolation, Pore pressure, Linear differential equations, Tables(Data)

IDENTIFIERS: (U) Soil consolidation, PE81102F, WUAFOSR2307C1, LPN-OSURF-783420/715107

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

AD-A143 381

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AD-A143 380

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OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) New Gallium Precursors for the Formation of High Purity Gallium Arsenide by Metal Organic Vapor Phase Deposition.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 84.

JUN 84

16P

PERSONAL AUTHORS: Schram, E. P. ;

CONTRACT NO. AFOSR-83-0142

PROJECT NO. 2305

TASK NO. D9

MONITOR: AFOSR
TR-84-0586

UNCLASSIFIED REPORT

ABSTRACT: (U) The reduction of gallium trichloride monoammonia adduct with lithium hydride affords lithium trichlorohydrido gallate whereas the non-coordinated trichloride affords the known species, lithium tetrahydrido gallate. Attempts to prepare the ammonia adduct of gallane via lithium tetrahydrido gallate and ammonium chloride resulted in decomposition with hydrogen evolution. Exploratory investigation geared towards the formation of gallium perfluoroalkyls, via discharge reactions involving hexafluoroethane and trifluoriodomethane, resulted in the gallium reduction of the pyrex reactors - construction of quartz reactors is therefore necessitated. (Author)

DESCRIPTORS: (U) *Gallium arsenides, *Synthesis (Chemistry), Purity, Decomposition, Ammonia, Lithium hydride, Reduction, Chlorides, Gallium compounds, Precursors, Ammonium compounds, Hydrogen

IDENTIFIERS: (U) PE61102F, WUAFOSR2305D9, LPN-OSURF-763496/715204

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SOUTHERN METHODIST UNIV DALLAS TEX DEPT OF ELECTRICAL ENGINEERING

(U) Sensor Noise and Kalman Filter for Aided Inertial Navigation System.

DESCRIPTIVE NOTE: Final rept. 15 Mar 82-14 Mar 83.

MAY 84

20P

PERSONAL AUTHORS: Greval, G. S. ;

CONTRACT NO. AFOSR-82-0006

PROJECT NO. 2304

TASK NO. D9

MONITOR: AFOSR
TR-84-0556

UNCLASSIFIED REPORT

ABSTRACT: (U) Inertial Navigation System, barometric altimeter, TACAN, and ILS are used to achieve a synergistic combination of the outputs of individual subsystems. Kalman filter is used to provide an ideal method for data processing in this multisensor navigation system. The filter design begins with the development of mathematical and statistical error models to describe the truth system. The truth model is simplified and reduced, in steps, to lower the computation burden on the on-board computer. The covariance analysis and the Monte Carlo methods of testing the performance of the Kalman filters based on reduced and simplified system models are discussed. Suggestions for further research in the area of fault detection and isolation are offered. (Author)

DESCRIPTORS: (U) *Inertial navigation, *Kalman filtering, *Navigation computers, Altimeters, Tacan, Integrated systems, Multisensors, Barometric pressure, Data processing, Monte Carlo method, Computers, Detectors, Filters, Simplification, Faults, Mathematical models, Detection, Errors, Covariance, Noise, Isolation, Models, Statistical analysis, Onboard, Navigation

IDENTIFIERS: (U) Multisensor systems, Onboard computers, PE61102, WUAFOSR230409

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 324 9/2

AD-A143 272 20/5 7/4

IOWA UNIV IOWA CITY DIV OF INFORMATION ENGINEERING

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Test Procedures and Design Methods for Reliable Large Scale Integrated Circuits and Systems.

(U) Quasi-Metastable Quartet Levels in Alkali-like Atoms and Ions.

DESCRIPTIVE NOTE: Final rept. 9 Jan 82-31 Aug 83.

MAY 84 4P

JAN 84 7P

PERSONAL AUTHORS: Reddy, S. M. ;

PERSONAL AUTHORS: Harris, S. E. ; Walker, D. J. ; Caro, R. G. ; Mendelsohn, A. J. ;

CONTRACT NO. AFOSR-78-3582

CONTRACT NO. MIPR-ARO-100-84, F49620-83-C-0018

PROJECT NO. 2304

MONITOR: ARO, AFOSR
20117.3-PH, TR-84-0855

TASK NO. A8

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-84-0555

Availability: Pub. in Optics Letters, v9 n5 p188-170 May 84 (No copies furnished by DTIC/NTIS).

UNCLASSIFIED REPORT

ABSTRACT: (U) The following four major problem areas were investigated in the course of the research supported: (1) procedures to detect faults in random access memories; (2) analysis and design of fault-tolerant computing networks; (3) design of testable microprocessors and iterative logic arrays; and (4) design and analysis of fault-tolerant connection networks. (Author)

Reprint: Quasi-Metastable Quartet Levels in Alkali-like Atoms and Ions.

DESCRIPTORS: (U) *Random access computer storage, *Tolerance, *Microprocessors, *Faults, Integrated circuits, Test methods, Iterations, Arrays, Logic, Networks

DESCRIPTORS: (U) *Molecular energy levels, *Ultraviolet lasers, *Molecular orbitals, *Metastable state, Alkali metals, Ions, Atoms, Ionization, Ultraviolet radiation, Reprints

IDENTIFIERS: (U) Fault detection, Fault tolerant computing, Logic arrays, LSI (Large Scale Integration), *JAFOSR2304A8, PE81102F

IDENTIFIERS: (U) Quartet levels, Radiation yields

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A143 178 12/1

FLORIDA UNIV GAINESVILLE

(U) Regulator Problem with Internal Stability: A Frequency Domain Solution.

APR 84 14P

PERSONAL AUTHORS: Khargonekar, P. P.; Ozguler, A. B. ;

CONTRACT NO. DAAG29-81-K-0138, AFOSR-81-0238

MONITOR: ARO, AFOSR
18343.13-MA, TR-84-0553

UNCLASSIFIED REPORT

Availability: Pub. in IEE Transactions on Automatic Control, VAC-29 n4 p332-343 Apr 84 (No copies furnished by DTIC/NTIS).

Reprint: Regulator Problem with Internal Stability: A Frequency Domain Solution.

DESCRIPTORS: (U) *Control theory, *Polynomials, Matrix theory, Signal processing, Feedback, Stability, Regulators, Reprints

AD-A143 174 7/3

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

(U) Organische Chemie mit Ultraschall (Organic Chemistry with Ultrasound),

83 4P

PERSONAL AUTHORS: Boudjouk, P. ;

CONTRACT NO. AFOSR-80-0239

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0441

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in NACHRICHTEN aus Chemie, Technik und Laboratorium, v31 p789-800 1983. Text in German.

Reprint: Organic Chemistry with Ultrasound.

DESCRIPTORS: (U) *Ultrasonics, *Organic chemistry, Catalysis, Literature surveys, Synthesis (Chemistry), Homogeneity, Heterogeneity, Chemical reactions, Reprints, Translations, Germany (East and West)

IDENTIFIERS: (U) WUAFOSR2303B2, PEB1102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

AD-A143 093 12/1

AD-A142 985 6/20 6/16

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM THEORY

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) On the Control of Linear Systems Whose Coefficients are Functions of Parameters.

(U) Effect of Hepatotoxic Nonadecafuorodecanoic Acid on Gene Expression in Rat Liver.

JAN 84 10P

DESCRIPTIVE NOTE: Final rept. 15 Apr 83-14 Jan 84.

10P

MAR 84 13P

PERSONAL AUTHORS: Kamen, E. W.; Khargonekar, P. P.;

PERSONAL AUTHORS: Webb, T. E.;

CONTRACT NO. DAAG29-81-K-0168, DAAG29-80-C-0050

CONTRACT NO. AFOSR-83-0134

MONITOR: ARO, AFOSR
18814.3-MA, TR-84-0552

PROJECT NO. 2312

UNCLASSIFIED REPORT

TASK NO. 09

Availability: Pub. in IEEE Transactions on Automatic Control, VAC29 n1 p25-33 Jan 84 (No copies furnished by DTIC/NTIS).

MONITOR: AFOSR
TR-84-0529

SUPPLEMENTARY NOTE: Supported in part by AFOSR-78-3034

UNCLASSIFIED REPORT

Reprint: On the Control of Linear Systems Whose Coefficients are Functions of Parameters.

ABSTRACT: (U) Nonadecafuorodecanoic acid (NDFDA), a biological test model for similar compounds used to produce aqueous film-forming foams, is a potent hepatotoxin. Since the compound has been shown to modify cellular membrane systems, the effect of NDFDA on membrane-dependent functions of genetic expression has been investigated. Messenger RNA transport through nuclear pores in a cell-free system derived from rat liver, was significantly inhibited when the nucleic were derived from NDFDA-treated rats. The induction of the hepatic enzyme tyrosine aminotransferase by hydrocortisone and insulin was near normal. In contrast, pretreatment with NDFDA inhibited induction by glucagon, suggesting that some receptor or post-receptor step in the glucagon-mediated activation of the membrane-bound adenylate cyclase system was defective.

DESCRIPTORS: (U) *Control theory, Linear systems, Riccati equation, Feedback, Reprints

DESCRIPTORS: (U) *Toxins and antitoxins, *Toxicity, *Organic acids, Films, Foam, Fire extinguishing agents, Tyrosine, Transferases, Amines, Liver, Rats

IDENTIFIERS: (U) Hepatotoxic, Nonadecafuorodecanoic acid, LPN-OSURF-783494/715202, PE81102F, WUAFOSR231209

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

AD-A142 984 17/7 12/1

AD-A142 919 5/10 6/18

STANFORD UNIV CA INFORMATION SYSTEMS LAB

CALIFORNIA UNIV LOS ANGELES

(U) Position Location from Sensors with Position Uncertainty.

(U) Measurement and Modification of Sensorimotor System Function during Visual-Motor Performance.

SEP 83 5P

DESCRIPTIVE NOTE: Annual technical rept. 30 Sep 82-29 Sep 83.

PERSONAL AUTHORS: Wax, M. ;

APR 84 10P

CONTRACT NO. DAAG29-81-K-0057, AFOSR-83-0228

PERSONAL AUTHORS: Sterman, M. B. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-82-0335

TASK NO. A8

PROJECT NO. 2313

MONITOR: AFOSR
TR-84-0490

TASK NO. A4

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0520

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Aerospace and Electronic Systems, VAES-19 n5 p658-661 Sep 83.

UNCLASSIFIED REPORT

Reprint: Position Location from Sensors with Position Uncertainty.

DESCRIPTORS: (U) Position finding, *Iterations, Models, Errors, Reprints

IDENTIFIERS: (U) Uncertainty, Maximum likelihood estimates, Location systems, Statistical analysis, Small errors, Estimates, Covariance matrices, WUAFOSR2304A6, PB81102F

ABSTRACT: (U) Studies conducted during the initial phase of this project had two major objectives. The first was the selection of a visual-motor performance task that met the needs of (a) long term operation, (b) physiological and functional appropriateness, (c) relevance to the Air Force mission, and (d) feasibility within the resources available to us. Towards this end four video games were tested on each of six adult subjects. Evaluation of these tasks as well as EEG correlates of performance led to the selection of one for subsequent studies. Our second objective was to determine if the quantitative analysis of somatosensory EEG characteristics could yield information predictive of performance. Preliminary findings indicate that specific frequency components do, indeed, change in relation to response accuracy and speed. These consistent observations provided support for our basic assumptions and will guide the focus of subsequent studies.

DESCRIPTORS: (U) *Vision, *Motor reactions, *Electroencephalography, *Performance(Human), tests, Video signals, Scenarios, Man computer interface, Tracking, Response(Biology), Patterns, Accuracy, Reaction time, Quantitative analysis, Visual cortex, Flight simulation, Air Force research

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A142 891 11/8 20/11

IDENTIFIERS: (U) Video games, Somatosensory reactions,
WUAFOSR2313A4, PEB1102F

CARNEGIE-MELLON UNIV PITTSBURGH PA

(U) The Effects of Deformation Mode and Microstructure
Fracture-Related Properties of Ti Alloys.

DESCRIPTIVE NOTE: Final rept. 1 Nov 79-30 Jun 83,

MAY 84 20P

PERSONAL AUTHORS: Allison, J. E.; Williams, J. C. ;

REPORT NO. JW-FR-2-AFOSR

CONTRACT NO. AFOSR-80-0044

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-84-0530

UNCLASSIFIED REPORT

ABSTRACT: (U) Fatigue crack growth has been studied in two binary Ti-Al alloys, an 8 wt.% Al and a 4 wt.% Al alloy. It has been found that the crack growth rate is faster than in the 4% Al alloy. The principal difference between the alloys is that the higher Al alloy exhibits planar slip. The effect of this planar slip character is to cause a more irregular crack path. This increase in crack path irregularity causes roughness-induced closure. Back face strain measurements have been used to measure the variation in closure and to calculate an effective delta K. It has been shown that the crack growth rates for the two alloys coincide if the variations in closure are taken into account. Elevated temperature crack growth experiments have also been conducted and oxide-induced closure effects have been found in this case. This type of closure also affects the crack growth rate. Finally, crack growth experiments at high mean stress have been conducted and it has been found that the closure effects disappear. The implications of this work on the selection of materials for fatigue crack growth limited applications is discussed. (Author)

DESCRIPTORS: (U) *Binary alloys, *Titanium alloys,
*Aluminum alloys, *Fracture(Mechanics),
*Fatigue(Mechanics), *Crack propagation, *Microstructure.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A142 891 CONTINUED

AD-A142 872 20/11

Deformation, Closures, Surface roughness, Measurement,
Strain(Mechanics), Stresses, Loads(Forces), Test methods

RENSELAER POLYTECHNIC INST TROY NY DEPT OF MATERIALS
ENGINEERING

IDENTIFIERS: (U) Slip characters, T1-6A1-4V, T1-4A1, T1-
8A1, WUAFOSR2308A1, PEB1102F

(U) Creep-Fatigue Interactions in Advanced Eutectic
Superalloys.

DESCRIPTIVE NOTE: Final rept. 1 Oct 79-30 Sep 83,

APR 84 39P

PERSONAL AUTHORS: Jones, K. N. ; Bylina, N. ; Stoloff, N. S. ;

CONTRACT NO. AFOSR-80-0015

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-84-0531

UNCLASSIFIED REPORT

ABSTRACT: (U) This project has been concerned with three facets of cyclic deformation of advanced eutectic composites: (a) high cycle, stress controlled fatigue; (b) stress controlled crack growth; (c) low cycle, strain controlled fatigue. Three alloys were selected for study: Nitac 14B, Cotac 744 and AG-170. Experiments have been carried out as a function of several variables: temperature, microstructure, and frequency, in order to obtain as complete a picture as possible of the relative advantages and disadvantages of the three alloys under cyclic loading conditions. In addition, the response of these alloys to cyclic deformation has been compared to that of conventional nickel base alloys. Early in the program it was noted that Cotac 744 was inferior in HCF and LCF properties to the other two alloys. Consequently, during the final year of the program LCF and da/dN tests were carried out on AG-170 and Nitac 14B only.

DESCRIPTORS: (U) *Creep, *Fatigue(Mechanics), Eutectics, Superalloys, Eutectic composites, Alloys, Deformation, Cycles, Strain(Mechanics), Nickel alloys, Microstructure, Crack propagation, Stresses, Interactions, Temperature

IDENTIFIERS: (U) Directional solidification, PEB1102F,
WUAFOSR2308A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A142 831 17/2:1 9/4 12/1

AD-A142 799 7/4

YLYK LTD ANN ARBOR MI

HARVARD UNIV CAMBRIDGE MASS DEPT OF CHEMISTRY

(U) High Speed Low-Cost Ways to Get Messages from a Sender to a Receiver When Some Channels Linking Them Become Inoperative.

(U) A Theoretical Study of the Energetics and Dynamics of High Energy Inelastic Collision Processes.

DESCRIPTIVE NOTE: Final rept. 30 Sep 83-31 Mar 84.

DESCRIPTIVE NOTE: Final rept. 1 Feb 81-14 May 83.

MAY 84 153P

APR 84 9P

PERSONAL AUTHORS: Blakley, B. ;

PERSONAL AUTHORS: Herschbach, D. R. ;

REPORT NO. YLYK/AFOSR/SBIRI/83-84/001

CONTRACT NO. F49620-80-C-0017

CONTRACT NO. F49620-83-C-0160

PROJECT NO. 2303

PROJECT NO. 3005

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR
TR-84-0544MONITOR: AFOSR
TR-84-0528

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This AFOSR SBIR Phase I Project produced explicitly the hyperfast pool/split/restitute algorithms of the Bloom technique. These algorithms, once they obtain hardware implementation, will be used as follows. They will make it possible for a sender to get all desired digital information to a receiver by coding it for transmission over several parallel channels in such a way that decoding will recover everything sent even when up to a predetermined number of channels fail. This project developed a set of design principles for hardware implementation of such p/s/r processes by means of existing microprocessors of sizes 4, 8 and 16 bits. (Author)

DESCRIPTORS: (U) *Channels, *Coding, *Receivers, *Transmitters, *Decoding, Digital systems, Low costs, Parallel orientation, Scalars

IDENTIFIERS: (U) Inoperative channels

ABSTRACT: (U) The overall objective of this research program was to develop theoretical methods for improving the prediction of potential energy surfaces relevant to high energy inelastic collision processes. A diatomic-in-molecules approximation for constructing potential energy surfaces of excited electronic states of the prototypical triatomic hydrogen system was developed. A new approximation method was devised to estimate cross sections for inelastic or reactive collision processes from a rotating rigid rod model. These semiempirical approaches were complemented by a comprehensive statistical theory for vector properties of collisions, including all angular distributions describing the orientations of the initial and final relative velocity vectors and/or the reactant and product rotational angular momentum vectors. (Author)

DESCRIPTORS: (U) *Surface chemistry, *Electronic states, *Potential energy, *Hydrogen, Diatomic molecules, Atoms, Collisions, Inelastic scattering, Excitation, Surfaces, Approximation(Mathematics), Cross sections, Statistics, Theory, Vector analysis, Velocity, Angular momentum, Interpolation, Molecular rotation, Molecular vibration

IDENTIFIERS: (U) Inelastic collisions, Triatomic molecules, PE61102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A142 749 20/12 20/5

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Laser-Induced Electron-Phonon Processes on Metal Surfaces.

MAY 84 8P

PERSONAL AUTHORS: Murphy, W. C. ; George, T. F. ;

CONTRACT NO. AFOSR-82-0048

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-84-0537

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80
n10 p5303-5307, 15 May 84.

Reprint: Laser-Induced Electron-Phonon Processes on Metal Surfaces.

DESCRIPTORS: (U) *Lasers, *Phonons, *Electrons, Surfaces, Metals, Semiconductors, Theory, Mathematical analysis, Perturbation theory, Reprints

IDENTIFIERS: (U) WUAFOSR2303A2, PE81102F

AD-A142 748 9/4 12/1

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Determining the Number of Signals by Information Theoretic Criteria.

DESCRIPTIVE NOTE: Technical rept..

NOV 83 5P

PERSONAL AUTHORS: Wax, M. ; Kallath, T. ;

CONTRACT NO. DAAG29-81-K-0057, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0515

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in Part by Contract DAAG29-79-C-0215.

ABSTRACT: (U) The determination of the number of signals in a wide class of problems, including array processing, harmonic retrieval and pole retrieval, is addressed. A new approach, based on the application of the information theoretic criteria for model identification introduced by Akaike, Schwartz and Rissanen, is presented. It is shown that the criterion introduced by Schwartz and Rissanen yields a consistent estimate of the number of signals, while the criterion introduced by Akaike yields an consistent estimate that tends, in the large sample limit, to overestimate the number of signals. (Author)

DESCRIPTORS: (U) *Information theory, *Signal processing, *Mathematical analysis, Problem solving, Signals, Counting methods, Determination, Estimates, Arrays, Harmonics, Information retrieval, Standards, Models, Identification, Time domain, Eigenvectors, Covariance, Matrices(Mathematics)

IDENTIFIERS: (U) WUAFOSR2304A8, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 747 9/2 9/5

AD-A142 747 CONTINUED

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Estimation and Control in the VLSI Era.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTORS: (U) *Computer architecture, *Parallel processing, *Integrated circuits, Modular construction, Kalman filtering, Algorithms, Decoding, Parallel orientation, Architecture, Time, Background, Control

DEC 83 14P

IDENTIFIERS: (U) Systolic arrays, Dataflow machines, VLSI (Very Large Scale Integration), WUAFOSR2304A6, PE81102F

PERSONAL AUTHORS: Kailath, T. ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0492

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at IEEE Conference on Decision and Control (22nd) Dec 83, San Antonio, TX.

ABSTRACT: (U) The theme of this lecture is that the availability of very high density integrated circuits will be changing our approach and emphasis to several problems in estimation and control. For example, the minimality of realizations will be less significant than their modularity, local interconnectedness, area time complexity measures, etc. Similarly, good algorithms for serial processing may be poor candidates for parallel implementation. While it is hard for me in mid-August to predict exactly what I shall say in the lecture in mid-December, I think it might be useful to provide in written form some of the background material on which a good part of my talk will be based. Thus, at this meeting at least, I plan to illustrate the above points by several examples, including: (1) description of a parallel architecture for the measurement update step (in triangular array form) of the Kalman filter; (2) development of the Schur algorithm as a better candidate than the Levinson algorithm for VLSI implementation of Toeplitz equation solvers; (3) comparison of the Berlekamp-Massey-Rissanen and Lanczos algorithms in the problems of partial realization and of the decoding of BCH codes; and (4) development of minimal, but pipelined and orthogonally-cascaded, implementations of time-invariant, finite-dimensional (ARMA) systems.

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AD-A142 745 12/1 9/4

AD-A142 733 20/5 14/2 14/5

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

HONEYWELL ELECTRO-OPTICS DIV LEXINGTON MA

(U) Modeling Rate-Modulated Selfexciting Point Processes.

(U) Holographic FLI for Detection of Defects.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Annual rept. 15 Jan 83-15 Jan 84,

DEC 83 4P

APR 84 81P

PERSONAL AUTHORS: Bruckstein, A. M.; Kallath, T. ;

PERSONAL AUTHORS: Reynolds, G. O.; Servaes, D. A.; VeVellis, J. B.; Peirce, D.; Mayville, R. ;

CONTRACT NO. AFOSR-83-0228

REPORT NO. 8309-38

PROJECT NO. 2304

CONTRACT NO. F49620-82-C-0001

TASK NO. A6

PROJECT NO. 2306

MONITOR: AFOSR

TASK NO. A2

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0495

SUPPLEMENTARY NOTE: Presented at the IEEE Conference on Systems, Man, Cybernetic, Dec 83, Delhi (India).

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper addresses several issues arising in the modeling of discrete event processes for which the sample-path evolution depends on the past trajectory and is also controlled by an independent modulating process. While information on local, sample-path evolution is sometimes readily obtainable or measurable, in many applications it is more important to predict ensemble averaged responses to variations in the modulation process. The authors discuss this problem in the framework of a general model for rate-modulated selfexciting processes and, under certain assumptions, derive a nonlinear ordinary differential equation for approximately predicting ensemble behavior from known sample-path evolution laws. A successful application of this method to a neural encoding process has already been made.

DESCRIPTORS: (U) *Mathematical models, *Point theorem, *Information theory, Trajectories, Modulation, Response, Predictions, Excitation, Nonlinear differential equations, Evolution(General), Control, Coding, Nervous system, Information processing

IDENTIFIERS: (U) WUAFOSR2304A6, PE81102F

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ABSTRACT: (U) This interim report describes work performed during Phase II on Two-Step Holographic Fringe Linearization Interferometry. The FLI process consists of deflecting the object beam between holographic exposures to create linear fringes and spatial filtering of the image reconstructed from the hologram about the linear fringe carrier frequency. This filtering is meant to discriminate between subsurface defects and random fringe noise. During this phase a loading limitation for the FLI process (of one quarter wave/linear fringe period for out-of-plane deformations) was demonstrated. To circumvent this limitation, two modifications to the FLI process were investigated: Four-exposure FLI - a Moire technique; and Laser Pulse separation control with dynamic loading. With the former method linear fringes have been recovered from the random noise in simulated laboratory experiment. Experiments to demonstrate the fringe shifts at defect locations with differential loading are still in progress. Preliminary experiments performed on the NADC holographic system indicate that it should be adequate, albeit cumbersome, to demonstrate the Laser Pulse Control Method. The finite element analysis is predicting the experimental fringe patterns obtained with static loading; and the modeling effort for the dynamic loading experiments is discussed. Analysis for the moire

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 733 CONTINUED

AD-A142 848 4/1 20/14

resulting from the three exposure hologram is described.

SRI INTERNATIONAL MENLO PARK CA

DESCRIPTORS: (U) *Holography, *Interferograms, *Defects(Materials), Subsurface, Holograms, Discrimination, Moire effects, Finite element analysis, Nondestructive testing, Detection, Interferometry, Linear systems, Carrier frequencies, Laser beams, Deflection, Pulsed lasers, Separation, Dynamic loads, Deformation, Static loads, Shifting

(U) High-Latitude Ionospheric Irregularities.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Mar 83-29 Feb 84,

MAY 84 159P

PERSONAL AUTHORS: Vickrey, J. F. ; Livingston, R. C. ; Robinson, R. M. ; Walker, N. B. ;

IDENTIFIERS: (U) FLI(Fringe Linearization Interferometry) Fringe shifts, PE81102F, WUAFDSR2308A2

IAC NO. NT-028481

CONTRACT NO. F49820-83-K-0025

IAC DOCUMENT TYPE: NTIAC - MICROFICHE --

PROJECT NO. 2310

TASK NO. A2

IAC SUBJECT TERMS: N--(U)HOLOGRAPHY, DETECTION, INTERFEROMETRIC HOLOGRAPHY, LASERS, MOIRE EFFECTS, FRINGES, LINEARITY, FILTERING, RECONSTRUCTION, IMAGES, SUBSURFACE, FINITE ELEMENT ANALYSIS, THEORY, MONITORING, STRESSES, CRACKS, POSITION(LOCATION);

MONITOR: AFOSR

TR-84-0510

UNCLASSIFIED REPORT

ABSTRACT: (U) This document summarizes studies on the morphology of ionospheric structure at high latitudes. The program encompasses both theoretical and experimental investigations into this rapidly developing field. Because of the vast range of scale sizes (hundreds of kilometers to centimeters) that make up the structure, and the need for time-continuous observations, we employ a diverse set of observational techniques. These include in situ observations from rockets and satellites as well as radio propagation and scattering measurements. Topics include: F-Region Cross-Field Diffusion Processes; High-Latitude Conductivity and Field Aligned Current Systems; Low-Altitude Image Striations Associated with Bottomside Equatorial Spread F--Observations and Theory; Irregularity Decay in an Isolated Plasma Bubble; Electrical Coupling Effects on the Temporal Evolution of F-Layer Plasma Structure; Aurora and Electrojet Configuration in the Early Morning Sector; Auroral Zone Conductivities within the Field-Aligned Current Sheets, and K sub P Dependence of Auroral Zone Field-Aligned Current Intensity.

DESCRIPTORS: (U) *Ionosphere, *Ionospheric scintillations, F region, Coupling(Interaction), E region, Diffusion, Plasmas(Physics), Striations, Aurorae, Electrojets, Ionospheric disturbances, Scale, Electric

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A142 845 7/5

fields, Magnetic fields, Electrical conductivity, Electron density, Radio transmission, Ionospheric propagation, Magnetosphere, Electrodynamics, High latitudes, Ionospheric models

NEW MEXICO UNIV ALBUQUERQUE DEPT OF CHEMISTRY
(U) Photoionization Investigation of Iodine Molecules and Clusters in a Supersonic Molecular Beam.

IDENTIFIERS: (U) Ionospheric structure, Cross field diffusion, Spread F, PE81102F, LPN-SRI-5741, WUAFOSR2310A2

DESCRIPTIVE NOTE: Final rept. 15 May 83-14 Feb 84,

APR 84 21P

PERSONAL AUTHORS: Walters, E. A. ;

CONTRACT NO. AFOSR-83-O183

PROJECT NO. 2303

TASK NO. D9

MONITOR: AFOSR
TR-84-O543

UNCLASSIFIED REPORT

ABSTRACT: (U) A nozzle was designed and constructed which is to produce clusters of iodine molecules in the gas phase. Preliminary tests were conducted. A partial photoion yield curve for the production of iodine molecular ions was obtained for the wavelength region of 1216-1254 A and 1299-1346 A at an optical resolution of 1.75 A. The adiabatic ionization potential of molecular iodine was determined to be 9.309 ± 0.008 eV with a spin-orbit splitting to the next highest electronic energy state of 0.845 ± 0.008 eV. Many autoionization features were observed, but because of the limited range of the wavelength study they were not assigned to Rydberg states.

DESCRIPTORS: (U) *Photoionization, *Iodine, Ionization, Gases, Molecules, Clustering, Electron energy, Ions, Molecular beams, Supersonic characteristics, Spin states, Nozzles, Splitting, Adiabatic conditions

IDENTIFIERS: (U) Wavelengths, Rydberg states, PE81102F, WUAFOSR2303D9

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AD-A142 845

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A142 844 12/1

AD-A142 843 9/4 12/1

CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND
APPLIED SCIENCE

RENSELAER POLYTECHNIC INST TROY NY DEPT OF ELECTRICAL
COMPUTER AND SYSTEMS ENGINEERING

(U) Stabilization Studies.

(U) A Trellis Code Construction and Coding Theorem for
Stationary Gaussian Sources.

DESCRIPTIVE NOTE: Final technical rept. 1 Feb 83-31 Jan
84.

NOV 83 8P

MAR 84 9P

PERSONAL AUTHORS: Mazon, B.; Pearlman, W. A.;

CONTRACT NO. AFOSR-79-0053

CONTRACT NO. AFOSR-81-0188

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A8

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0503MONITOR: AFOSR
TR-84-0504

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period four papers were
written including the titles, Stabilization of infinite
dimensional systems and the steady state Riccati equation,
Stability of an exponentially stabilize system, and
Strong stability of quasi-affine transforms of
contraction semigroups. Further information on these
papers and the research topics involved are contained in
this report. (Author)

DESCRIPTORS: (U) *Stabilization, Steady state, Riccati
equation, Exponential functions,
Transformations(Mathematics), Groups(Mathematics)

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A8

IDENTIFIERS: (U) *Trellis code, PE81102F, WUAFOSR2304A1

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Information Theory, VIT-29 n8 p924-930 Nov 83.

Reprint: A Trellis Code Construction and Coding Theorem
for Stationary Gaussian Sources.

DESCRIPTORS: (U) *Coding, *Coders, *Theorems,
Information theory, Stationary, Gaussian quadrature,
Distortion, Reprints

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 842 12/1

AD-A142 841 4/1

PITTSBURGH UNIV PA

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

(U) Polynomial Matrix Primitive Factorization Over Arbitrary Coefficient Field and Related Results.

(U) VHF Echoes from the High-Latitude Mesosphere and Lower Thermosphere: Observations and Interpretations.

OCT 82 11P

OCT 83 17P

PERSONAL AUTHORS: Guiver, J. P. ; Bose, N. K. ;

PERSONAL AUTHORS: Balsley, B. B. ; Ecklund, W. L. ; Fritts, D. C. ;

CONTRACT NO. AFOSR-78-3542

CONTRACT NO. AFOSR-82-0125, NSF-ATM80-23128

PROJECT NO. 2304

PROJECT NO. 2310

TASK NO. AB

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0522

TR-84-0538

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Circuits and Systems, VCAS-28 n10 p848-857 Oct 82.

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Atmospheric Sciences, v40 n10 p2451-2488 Oct 83.

Reprint: Polynomial Matrix Primitive Factorization Over Arbitrary Coefficient Field and Related Results.

Reprint: VHF Echoes from the High-Latitude Mesosphere and Lower Thermosphere: Observations and Interpretations.

DESCRIPTORS: (U) *Algorithms, *Factor analysis, *Polynomials, Matrices(Mathematics), Coefficients, Extraction, Bivariate analysis, Reprints

DESCRIPTORS: (U) *Radar signals, *Echo ranging, *Thermosphere, *Mesosphere, Signal to noise ratio, Seasonal variations, Gravity waves, Atmospheric tides, High latitudes, Arctic regions, Alaska, Reprints

IDENTIFIERS: (U) *Factorization, PE81102F, WUAFOSR2304A8

IDENTIFIERS: (U) PE81102F, WUAFOSR2310A1

AD-A142 842

AD-A142 841

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A142 640 20/6 12/1

AD-A142 638 9/2

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Equal-Noise Spectroscopic Measurement,

(U) New Adaptive Processor for Coherent Signals and Interference,

MAR 84 8P

MAR 84 5P

PERSONAL AUTHORS: Hernandez, G.; Silca, R. J.; Romick, G. J.;

PERSONAL AUTHORS: Shan, T. J.; Kallath, T.;

CONTRACT NO. AFOSR-80-0240

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2310

PROJECT NO. 2304

TASK NO. A2

TASK NO. A8

MONITOR: AFOSR
TR-84-0514

MONITOR: AFOSR
TR-84-0517

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Optics, v23 n6 p915-919, 15 Mar 84.

ABSTRACT: (U) In this paper we introduce a new adaptive processor able to work well even when the desired signal and the interference are coherent. The present adaptive processors fail to operate in these cases. The results of simulations appear to confirm the theoretical predictions. (Author)

Reprint: Equal-Noise Spectroscopic Measurement.

DESCRIPTORS: (U) *Emission spectroscopy, *Mathematical models, Ionosphere, Measurement, Reprints

IDENTIFIERS: (U) Fabry Perot spectrometers, PE81102F, WUAFOSR2310A2

DESCRIPTORS: (U) *Processing equipment, *Adaptive systems, *Computerized simulation, Coherence, Predictions, Signals, Theory

IDENTIFIERS: (U) Coherent processors, Weight vectors, Coherent interference, PE81102F, WUAFOSR2304A8

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TECHNICAL REPORT SUMMARIE. (U) AIR FORCE OFFICE OF
SCIENTIFIC RESEARCH BOLLING AFB DC B J WERT OCT 84
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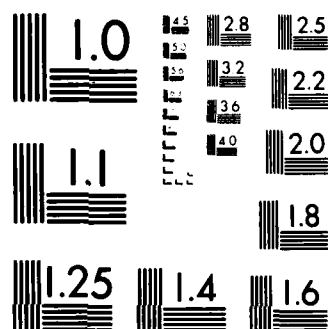
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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 837 12/1

AD-A142 838 12/1

GEORGIA INST OF TECH ATLANTA SCHOOL OF MATHEMATICS

WISCONSIN UNIV-MADISON DEPT OF MATHEMATICS

(U) Final Scientific Report for Grant AFOSR-82-0329,
September 1, 1982 - September 30, 1983.

(U) Final Report on Scientific Activities Pursuant to the
Provisions of Grant AFOSR-79-0018 during the Period
November 1, 1982 to October 31, 1983.

DESCRIPTIVE NOTE: Final scientific rept..

DESCRIPTIVE NOTE: Final rept..

MAY 84 4P

MAY 84 61P

PERSONAL AUTHORS: Demko, S. G. ;

PERSONAL AUTHORS: Russell, D. L. ;

CONTRACT NO. AFOSR-82-0329

CONTRACT NO. AFOSR-79-0018

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A3

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0508

TR-84-0508

UNCLASSIFIED REPORT

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ABSTRACT: (U) Research supported under this effort investigated some of the spectral and invertibility properties of band matrices. Spectral theory and classical approximation theory were used to give a new proof of the exponential decay of the entries of the inverses of band matrices. The problem of obtaining spectral information about a given matrix from its submatrices was studied. Another result obtained during the research effort was that for subspaces of the continuous functions on the unit interval that have B-spline like bases there is an interpolating projection whose norm depends only on the condition number of the basis. (Author)

ABSTRACT: (U) Research during this period was carried out in the general area of control theory of partial differential equations and the operation of the Modeling, Information Processing and Control Facility at the University of Wisconsin was begun. The program involves three distinct phases, all of which are under some degree of development. There is the fundamental program of research on the control theory of distributed parameter systems and the related program of research on self-excited oscillations related to flutter phenomena, the specific research program aimed at the development and improvement of control and identification strategies in connection with wing flutter problems, and the new area of distributed parameter model development and calibration in connection with the MIPAC facility. (Author)

DESCRIPTORS: (U) *Matrix theory, Band spectra, Inversion, Approximation(Mathematics), Theory, Decay, Exponential functions, Vector spaces, Intervals, Splines, Functions

IDENTIFIERS: (U) PE81102F, WJAFOSR2304A3

DESCRIPTORS: (U) *Mathematics, *Control theory, *Partial differential equations, Models, Information processing, Parameters, Flutter, Control, Identification, Strategy

IDENTIFIERS: (U) PE81102F, WJAFOSR2304A1

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AD-A142 838

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLO8F

AD-A142 835 9/2

AD-A142 834 20/1 20/14

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

DELAWARE UNIV NEWARK DEPT OF MATHEMATICAL SCIENCES

(U) The Design and Construction of a Large Highly Parallel Research Computer.

(U) Interim Scientific Report, Grant AFOSR--81-0103, 1 May 83 to 30 April 84.

DESCRIPTIVE NOTE: Final rept. 1 Sep 80-28 Feb 83.

DESCRIPTIVE NOTE: Interim scientific rept..

APR 83 8P

APR 84 13P

PERSONAL AUTHORS: Rieger, C. ; Weiser, M. ;

PERSONAL AUTHORS: Colton, D. L. ;

CONTRACT NO. AFOSR-80-0270

CONTRACT NO. AFOSR-82-0328

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A2

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0505

TR-84-0502

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Design and construction of several prototype parallel processing computers has been completed. These computers, all versions of the ZMOB parallel processing system, led up to the 256 processor ZMOB still undergoing integration and testing. Operating system and support software were developed for the ZMOB architecture, including a Zmob simulator, a system for graphical display of communications activity, and several software debugging testbeds.

ABSTRACT: (U) Abstracts are presented for seven papers with titles including, Uniqueness of solutions to the inverse acoustic scattering problem, Far field patterns in acoustic and electromagnetic scattering, Dense sets and far field patterns in electromagnetic wave propagation, The inverse scattering problem for time harmonic acoustic waves, and The strong maximum principle for the heat equation.

DESCRIPTORS: (U) *Parallel processors, Digital computers, Microprocessors, Computer communications

DESCRIPTORS: (U) *Acoustic scattering, *Abstracts, *Inverse scattering, Far field, Patterns, Electromagnetic wave propagation, Electromagnetic scattering

IDENTIFIERS: (U) *ZMOB computers, PE81102F, WJAFOSR2304A2

IDENTIFIERS: (U) PE81102F, WJAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOGF

AD-A142 631

7/4

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Location of Transition States in Reaction Mechanisms.

84

8P

PERSONAL AUTHORS: Dewar, M. J. S. ; Healy, E. F. ; Stewart, J. J. P. ;

CONTRACT NO. F49620-83-C-0024

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR
TR-84-0512

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Chemical Society, Faraday Transactions 2, v80 p227-233 1984.

Reprint: Location of Transition States in Reaction Mechanisms.

DESCRIPTORS: (U) *Transitions, *Reaction kinetics, Chemical reactions, Geometry, Mathematical analysis, Reprints, Computer programs

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

AD-A142 629

4/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF METEOROLOGY

(U) Focusing Mechanisms in the Texas Hill Country Flash Floods of 1978.

DEC 83

15P

PERSONAL AUTHORS: Caracena, F. ; Fritsch, J. M. ;

CONTRACT NO. AFOSR-79-0125

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-84-0513

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Monthly Weather Review, v111 n12 p2319-2332 Dec 83.

Reprint: Focusing Mechanisms in the Texas Hill Country Flash Floods of 1978.

DESCRIPTORS: (U) *Thunderstorms, Texas, Flooding, Weather, Meteorological phenomena, Meteorological data, Air mass analysis, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 828 7/4

AD-A142 827 17/9 4/2

BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

(U) Structural Similarities and Differences among Mixed-Metal Clusters Containing a Single M(PPh3) (M = Cu, Ag or Au).

(U) Mesospheric Radar Echoes at Poker Flat, Alaska: Evidence for Seasonally Dependent Generation Mechanisms.

84

5P

DEC 83 7P

PERSONAL AUTHORS: Salter, I. D.; Stone, F. G. A.;

PERSONAL AUTHORS: Balsley, B. B.; Ecklund, W. L.; Fritts, D. C.;

CONTRACT NO. AFOSR-82-0070

CONTRACT NO. AFOSR-82-0125

PROJECT NO. 2303

PROJECT NO. 2310

TASK NO. B2

TASK NO. A1

MONITOR: AFOSR TR-84-0541

MONITOR: AFOSR TR-84-0535

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v280 pC71-C74 1984.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Radio Science, v18 n8 p1053-1058 Nov-Dec 83.

Reprint: Structural Similarities and Differences among Mixed-Metal Clusters Containing a Single M(PPh3) (M = Cu, Ag or Au).

Reprint: Mesospheric Radar Echoes at Poker Flat, Alaska: Evidence for Seasonally Dependent Generation Mechanisms.

DESCRIPTORS: (U) *Molecular structure, Clustering, Comparison, Mixing, Geometry, Complex compounds, Reprints

DESCRIPTORS: (U) *Meteorological radar, Meteorological data, Mesosphere, Seasonal variations, Alaska, Reprints

IDENTIFIERS: (U) *Cluster compounds, Mixed metal clusters, PE81102F, WJAFOSR230382

IDENTIFIERS: (U) Radar echo areas, PE81102F, WJAFOSR2301A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 626 17/9 4/2

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

(U) Poker Flat MST (Mesosphere-Stratosphere-Troposphere) Radar and Meteorological Rocketsonde Wind Profile Comparisons.

MAY 84 4P

PERSONAL AUTHORS: Smith, S. A. ; Fritts, D. C. ;

CONTRACT NO. AFOSR-82-0125

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-84-0533

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Geophysical Research Letters, v11 n5 p538-540 May 84.

Reprint: Poker Flat MST (Mesosphere-Stratosphere-Troposphere) Radar and Meteorological Rocketsonde Wind Profile Comparisons.

DESCRIPTORS: (U) *Meteorological radar, Wind velocity, Sounding rockets, Profiles, Reprints

IDENTIFIERS: (U) MST radar, Rocket sondes, PE61102F, WUAFOSR2301A1

AD-A142 626

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AD-A142 625 20/2 12/1

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

(U) A Note on the Occupational Degeneracy for Dimers on a Saturated Two-Dimensional Lattice Space.

84 7P

PERSONAL AUTHORS: Hock, J. L. ; McQuistan, R. B. ;

CONTRACT NO. AFOSR-81-0192

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0521

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Discrete Applied Mathematics, v8 p101-104 1984.

Reprint: A Note on the Occupational Degeneracy for Dimers on a Saturated Two Dimensional Lattice Space.

DESCRIPTORS: (U) *Dimers, Lattice dynamics, Set theory, Two dimensional, Space(Room), Saturation, Reprints, Recursive functions

IDENTIFIERS: (U) *Occupational degeneracy, PE61102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A142 824 7/3

AD-A142 819 20/8 14/5 9/2

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES IMAGE
PROCESSING INST

(U) PI-Complexes as Intermediates in Reactions.
Biomimetic Cyclization.

(U) Nonlinear Real-Time Optical Signal Processing.

84 8P

DESCRIPTIVE NOTE: Annual technical rept. 15 Apr 82-14 Apr
83.

PERSONAL AUTHORS: Devar, M. J. S. ; Reynolds, C. H. ;

DEC 83 133P

CONTRACT NO. F49620-83-C-0024

PERSONAL AUTHORS: Savchuk, A. A. ; Strand, T. C. ; Tanguay, A.
R. , Jr;

PROJECT NO. 2303

TASK NO. 82

REPORT NO. USCIP1-1100

MONITOR: AFOSR
TR-84-0511

CONTRACT NO. AFOSR-81-0082

PROJECT NO. 2305

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical
Society. v106 n8 p1744-1750 1984.

Reprint: PI-Complexes as Intermediates in Reactions.
Biomimetic Cyclization.

DESCRIPTORS: (U) *Complex compounds, Chemical reactions,
Cyclic compounds, Cations, Biochemistry, Reprints

IDENTIFIERS: (U) *PI complexes, Intermediates,
Carbocations, PE81102F, WUAFOSR230382

SUPPLEMENTARY NOTE: Prepared in cooperation with Hughes
Research Labs., Malibu, CA. under Contract no. F49620-81-
C-0088.

UNCLASSIFIED REPORT

ABSTRACT: (U) The results of the second year of a two
year research program in nonlinear real-time optical
signal processing are described. The research has
concentrated on optical sequential logic systems for
parallel digital processing and on variable grating mode
(VGM) liquid crystal real-time spatial light modulators.
The goal of the program is to extend fast parallel
nonlinear operations to optical processing systems with
large time-bandwidth and space-bandwidth products.
Parallel and twisted nematic liquid crystal light valve
(LCLV) devices have been used as a nonlinear element in a
feedback arrangement in the binary sequential logic
system. A computer generated hologram fabricated on an e-
beam system serves as a beamsteering interconnection
element. A completely optical oscillator and frequency
divider have been experimentally demonstrated, and
various circuit interconnection techniques have been
explored. Research has continued on variable-grating mode
(VGM) liquid crystal devices that perform local spatial

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A142 819 CONTINUED

AD-A142 817 12/1 9/3

frequency modulation as a function of the incident intensity.

DESCRIPTORS: (U) *Optical processing, *Nonlinear systems, *Signal processing, *Data processing, *Information processing, Real time, Liquid crystal display systems, Parallel processing, Optical data, Research management, Computer logic, Analog systems, Computations, Feedback, Input

IDENTIFIERS: (U) Light valves, Optical computing, VGM(Variable Grating Mode), LCLV(Liquid Crystal Light Valves), PE81102F, WUAFOSR230581

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) High-Resolution Spectral Analysis Using Multiple-Interval Adaptive Prediction,

83 24P

PERSONAL AUTHORS: Egardt, B. ; Kallath, T. ; Reddy, V. U. ;

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR 84-0498

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Circuits Systems Signal Process, v2 n4 p422-443 1983. Sponsored in part by Contract DAAG29-79-C-0047 and Grant NSF-ENG78-10003.
Reprint: High-Resolution Spectral Analysis Using Multiple-Interval Adaptive Prediction.

DESCRIPTORS: (U) *Numerical analysis, *Mathematical prediction, *Spectrum analysis, High resolution, Signal processing, Estimates, Coefficients, Reprints

IDENTIFIERS: (U) Sinusoids, PE81102F, WUAFOSR2304A8

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AD-A142 817

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A142 815 12/1 9/3

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Spatial Smoothing Approach for Location Estimation of Coherent Sources.

(U) A New Approach to Decentralized Array Processing.

OCT 83 6P

MAR 84 5P

PERSONAL AUTHORS: Shan, T. J. ; Wax, M. ; Kallath, T. ;

PERSONAL AUTHORS: Wax, M. ; Kallath, T. ;

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A6

TASK NO. A6

MONITOR: AFOSR
TR-84-0493MONITOR: AFOSR
TR-84-0491

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Proceedings of the Asilomar Conference (17th), p1-5 Oct 83. Sponsored in part by Contracts DAAG29-79-C-0215 and DAAG29-81-K-0057.

SUPPLEMENTARY NOTE: Pub. in Proceedings of ICASSP '84 Held at San Diego, Ca., in Mar 84, p1-5. Sponsored in part by Contracts DAAG29-79-C-0215 and DAAG29-81-K-0057.

Reprint: Spatial Smoothing Approach for Location Estimation of Coherent Sources.

Reprint: A New Approach to Decentralized Array Processing.

DESCRIPTORS: (U) *Numerical methods and procedures, *Estimates, *Broadband, Coherence, Linear arrays, Matrices(Mathematics), Reprints

DESCRIPTORS: (U) *Algorithms, *Processing, *Arrays, Decentralization, Estimates, Covariance, Matrices(Mathematics), Triangulation, Reprints

IDENTIFIERS: (U) *Eigenstructures,

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A6

*Smoothing(Mathematics), Spectral density, PE81102F, WUAFOSR2304A6

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AD-A142 815

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SEARCH CONTROL NO. EVL08F

AD-A142 814 12/1

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) An Efficient, Recursive-Least-Squares, Fractionally Spaced Equalizer Using Intersymbol Interpolation.

MAY 84 5P

PERSONAL AUTHORS: Cioffi, J. M.; Kallath, T. ;

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0516

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of ICC' 84 Held at Amsterdam, Holland on 14-17 May 84, p2.1 - 2.5. Sponsored in part by Contract DAAG29-79-C-0215.

Reprint: An Efficient, Recursive-Least-Squares, Fractionally Spaced Equalizer Intersymbol Interpolation.

DESCRIPTORS: (U) *Least squares method, *Recursive functions, Equalization, Interpolation, Convergence, Multichannel, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

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AD-A142 809 11/8 20/11 12/1

CALIFORNIA UNIV BERKELEY DEPT OF MATERIALS SCIENCE AND MINERAL ENGINEERING

(U) Fatigue Behavior of Long and Short Cracks in Wrought and Powder Aluminum Alloys.

DESCRIPTIVE NOTE: Annual rept. 15 Apr 83-14 Apr 84.

MAY 84 205P

PERSONAL AUTHORS: Ritchie, R. O. ;

REPORT NO. UCB/RP/84/A1021

CONTRACT NO. AFOSR-82-0181

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-84-0509

UNCLASSIFIED REPORT

ABSTRACT: (U) The fatigue behavior of short cracks, which are small compared to the scale of the microstructure, small compared to the scale of local plasticity or simply physically small (i.e., approximately 1 mm), must be considered as one of the major factors limiting the application of defect-tolerant fatigue design for airframe and engine components. Accordingly, the current program is aimed at identifying factors which govern the growth of such short cracks (in contrast to long cracks) in a series of commercial aluminum alloys, with specific reference to behavior at near-threshold levels below approximately 10 to the minus 8th power mm/cycle). In this second annual report, the status of the program is described in terms of i) an expanded review of the factors which lead to differences in long and short crack behavior, with particular regard to the role of crack closure mechanisms, ii) a description of experiments performed to characterize the role of microstructure in influencing the propagation of long cracks in I/M 7150 aluminum alloys, and iii) a description of experiments carried out to isolate the effects of crack closure on the propagation of both long and short cracks, and specifically to investigate the location of the closure responsible for the development

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SEARCH CONTROL NO. EVL06F

AD-A142 809 CONTINUED

of a threshold.

DESCRIPTORS: (U) *Aluminum alloys, *Fatigue(Mechanics),
*Cracks, *Crack propagation, *Factor analysis, Mechanical
properties, Powder alloys, Wrought metals,
Failure(Mechanics), Defects(Materials), Aging(Materials),
Tolerances(Mechanics), Plastic deformation, Modulus of
elasticity, Stresses, Morphology, Microstructure,
Structural properties, Microcracking, Equations

IDENTIFIERS: (U) Aluminum alloy 7150, PE81102F,
WUAFOSR2306A1

AD-A142 801 19/4 12/1 20/4

MIAMI UNIV CORAL GABLES FLA DEPT OF PHYSICS

(U) Numerical and Analytical Studies of Steady Detonation
Waves with Expansion Losses.

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-14 Dec 83.

FEB 84 24P

PERSONAL AUTHORS: Huerta, M. A. ;

CONTRACT NO. AFOSR-82-0241

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-84-0180

UNCLASSIFIED REPORT

ABSTRACT: (U) The differential equations for the
evolution of the fluid quantities in steady detonation
waves are integrated numerically using a fourth order
Runge-Kutta-Fehlberg method. Strong and weak detonation
waves are found as well as detonation failure. In the
weak regime there is a continuum of propagation speeds
for a given expansion loss.

DESCRIPTORS: (U) *Detonation waves, *Numerical analysis,
*Differential equations, *Fluid flow, Expansion, Losses,
Three dimensional flow, Explosive charges, Boundary value
problems, Reaction kinetics, Mach number, Models,
Trajectories, Wave propagation, Velocity, One dimensional,
Integration, Steady flow, Numerical methods and
procedures

IDENTIFIERS: (U) Runge Kutta Fehlberg method, PE81102F,
WUAFOSR2301A8

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 800 6/4 6/16

AD-A142 800 CONTINUED

BOSTON UNIV MA CENTER FOR ADAPTIVE SYSTEMS

Algorithms, Brightness

(U) Nonlinear Dynamics of Multi-Channel Binocular Vision.

IDENTIFIERS: (U) PE81102F, WUAFOSR2313A5

DESCRIPTIVE NOTE: Annual scientific rept. 1 Feb 83-31 Jan 84.

MAR 84 20P

PERSONAL AUTHORS: Grossberg, S. ;

CONTRACT NO. F49620-83-C-0088

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-84-0527

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress was made in three related areas: vision, movement, and rhythm. A realtime processing theory was introduced of how the visual system discounts several types of noise in visual data, yet rapidly generates global visual representations. These mechanisms can be interpreted both behaviorally and neurally. The mechanisms describe new parallel processing algorithms that operate within hierarchical networks. Simulations were made of real and illusory contour formation, neon color spreading, complementary color induction, and filling-in. The theory physically interprets and generalizes Land's retinex theory of color vision, and unifies the explanation of monocular and binocular brightness data. The simulated data include Craik-O'Brien demonstrations comparing brightness of smoothly modulated and step-like luminance profiles; nonclassical differences between the perception of luminance decrements and increments; Fechner's paradox, binocular brightness averaging, and binocular brightness summation; binocular rivalry; and fading of stabilized images and ganzfelds. Two parallel contour processes interact to generate the theory's brightness, color, and form explanations.

DESCRIPTORS: (U) *Vision, *Color vision, Motion, Biological rhythms, Real time, Processing, Theory,

AD-A142 800

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AD-A142 597 6/16

EEG SYSTEMS LAB SAN FRANCISCO CA

(U) Brain Potential (BP) Evidence for Lateralization of Higher Cognitive Functions.

83 50P

PERSONAL AUTHORS: Gevins, A. S. ;

CONTRACT NO. F49820-82-K-0008

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-84-0528

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Cerebral Hemisphere Asymmetry p335-382 1983.

Reprint: Brain Potential (BP) Evidence for Lateralization of Higher Cognitive Functions.

DESCRIPTORS: (U) *Brain, *Electroencephalography, Cognition, Humans, Information processing, Electrical properties, Bioelectricity, Patterns, Reprints

IDENTIFIERS: (U) Evoked potentials, PE81102F, WUAFOSR2313A4

AD-A142 581 12/1 5/1

EEG SYSTEMS LAB SAN FRANCISCO CA

(U) Ignorance Based Systems,

MAR 84 5P

PERSONAL AUTHORS: Gevins, A. S. ; Morgan, N. H. ;

CONTRACT NO. F49820-82-K-0008

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-84-0524

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE International Conference on Acoustics, Speech, and Signal Processing, v3 p39A.5.1-39A.5.4 Mar 84.

Reprint: Ignorance Based Systems.

DESCRIPTORS: (U) *Numerical methods and procedures, *Iterations, *Systems engineering, Decision making, Artificial intelligence, Signal processing, Variables, Reprints

IDENTIFIERS: (U) Expert systems, PE81102F, WUAFOSR2313A

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SEARCH CONTROL NO. EVL08F

AD-A142 580 12/1 8/5

AD-A142 578 8/20 8/5 8/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) On Errors-in-Variables for Binary Regression Models,
84 8P

(U) Chemical Carcinogen (Hydrazine et al.) Induced
Carcinogenesis of Human Diploid Fibroblasts in vitro.

PERSONAL AUTHORS: Carroll, R. J.; Spiegelman, C. H.; Lan, K.
K. G.; Bailey, K. T.; Abbott, R. D.;

DESCRIPTIVE NOTE: Final rept. 1 Jul 80-30 Nov 83,
DEC 83 72P

CONTRACT NO. F48820-82-C-0008

PERSONAL AUTHORS: Milo, G.;

PROJECT NO. 2304

CONTRACT NO. F48820-80-C-0085

TASK NO. A5

PROJECT NO. 2312

MONITOR: AFOSR
TR-84-0519

TASK NO. A5

MONITOR: AFOSR
TR-84-0532

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Biometrika, v71 n1 p19-25
1984.

UNCLASSIFIED REPORT

Reprint: On Errors-in-Variables for Binary Regression
Models.

DESCRIPTORS: (U) *Mathematical models, *Binary
arithmetic, *Regression analysis, *Errors,
*Cardiovascular diseases, Variables, Mathematical
prediction, Measurement, Estimates, Probability, Coronary
disease, Risk, Blood pressure, Cholesterol, Reprints

IDENTIFIERS: (U) Functional model, Logistic regression,
Probit regression, Structural model, PE81102F,
WUAFOSR2304A5

SUPPLEMENTARY NOTE: Continuation of Contract F48820-77-C-
0110.

ABSTRACT: (U) The initiation of a carcinogenic insult
appears to be optimally effective when the cells are
insulted in early S phase of the cell cycle. The
transformed phenotype has sarcoma associated determinants
that are similar to the ectopic determinants found on
human sarcoma-tumor tissue. Both these cell types, i.e.
chemically transformed human fibroblasts and sarcoma
tumor cells, exhibit cellular invasiveness, neoplastic
potential and finite but extended lifespan in vitro.
Using selection pressures for culturing of human normal
cells in culture followed by insulting the DNA we can
isolate cells from the transformed phenotype, from cells
that will respond to the insult as a toxic insult. The
carcinogen-specific DNA adducts formed under these
conditions are qualitatively and quantitatively similar.

DESCRIPTORS: (U) *Hydrazines, *Molecular biology,
*Carcinogens, *Reports, Fibroblasts, In vitro analysis,
Cells(Biology), Humans, Toxicity, Molecules, Genetics,
Coding

IDENTIFIERS: (U) *Hydrazine, LPN-OSURF-782178/712881,
PE81102F, WUAFOSR2312A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 577 6/16 6/4

EEG SYSTEMS LAB SAN FRANCISCO CA

(U) Overview of the Human Brain as a Distributed Computing Network.

83 8P

PERSONAL AUTHORS: Gavins, A. S. ;

CONTRACT NO. F49620-82-K-0006

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-84-0525

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE International Conference on Computer Design, p13-17 1983.

Reprint: Overview of the Human Brain as a Distributed Computing Network.

DESCRIPTORS: (U) *Brain, Humans, Networks, Computations, Information processing, Data storage systems, Capacity(Quantity), Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2313A4

AD-A142 578 12/1

PITTSBURGH UNIV PA

(U) Modeling of 2-D LSV Systems with Applications.

MAY 83 5P

PERSONAL AUTHORS: Valenzuela, H. M. ; Bose, N. K. ;

CONTRACT NO. AFOSR-78-3542

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-84-0523

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE International Symposium on Circuits and Systems Proceedings, p927-930 May 83.

Reprint: Modeling of 2-D LSV Systems with Applications.

DESCRIPTORS: (U) *Image processing, Two dimensional, Reprints

IDENTIFIERS: (U) LSVS(Linear Shift Variant Systems), Deconvolved images, Impulse response, State models, Recursions, Causal cones, Degeneracies, PE81102F, WUAFOSR2304A6

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 575 12/1

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) On Generalized Balanced Realizations,

AUG 83 13P

PERSONAL AUTHORS: Verriest, E. ; Kailath, T. ;

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0494

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Automatic Control, VAC-28 n8 p833-844 Aug 1983.

Reprint: On Generalized Balanced Realizations.

DESCRIPTORS: (U) *Linear systems, *Analytic functions, Digital filters, Approximation(Mathematics), Transformations(Mathematics), Reprints

IDENTIFIERS: (U) *Time variant systems, PE61102F, WUAFOSR2304A8

AD-A142 575

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AD-A142 574 4/2

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

(U) Shear Excitation of Atmospheric Gravity Waves. Part 2. Nonlinear Radiation from a Free Shear Layer,

FEB 84 16P

PERSONAL AUTHORS: Fritts, D. C. ;

CONTRACT NO. AFOSR-82-0125

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-84-0534

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Atmospheric Sciences, v41 n4 p524-537, 15 Feb 84. See also AD-A126 730.

Reprint: Shear Excitation of Atmospheric Gravity Waves. Part 2. Nonlinear Radiation from a Free Shear Layer.

DESCRIPTORS: (U) *Gravity waves, Layers, Troposphere, Excitation, Vortices, Shear properties, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 568 7/4

AD-A142 561 4/1 1/3

STANFORD UNIV CA DEPT OF CHEMISTRY

UNIVERSITY OF MANCHESTER INST OF SCIENCE AND TECHNOLOGY
(ENGLAND) DEPT OF PHYSICS

(U) H + D2 Reaction Dynamics. Determination of the Product
State Distributions at a Collision Energy of 1.3 eV.

(U) A Laboratory Study of Aircraft Precipitation Static
Charging.

MAY 84 18P

PERSONAL AUTHORS: Marino, E. E. ; Rettner, C. T. ; Zare, R.
N. ;

DESCRIPTIVE NOTE: Final scientific rept. 1 Aug 82-31 Jul
83,

CONTRACT NO. F49620-83-C-0033

MAY 84 50P

PROJECT NO. 2303

PERSONAL AUTHORS: Illingworth, A. J. ;

TASK NO. B1

CONTRACT NO. AFOSR-82-0323

MONITOR: AFOSR
TR-84-0542

PROJECT NO. 2310

TASK NO. A1

UNCLASSIFIED REPORT

MONITOR: AFOSR
TR-84-0540

SUPPLEMENTARY NOTE: Pub. in The Jnl. of Chemical Physics,
v80 n9 p4142-4156, 1 May 1984.

UNCLASSIFIED REPORT

Reprint: H D2 Reaction Dynamics. Determination of the
Product State Distributions at a Collision Energy of 1.3
eV.

ABSTRACT: (U) Laboratory experiments show that when
small ice particles collide with targets at speeds of up
to 80m/s then the charge transfer is dependent upon the
work function of the target material. Most common
materials charge negatively, in agreement with observed
aircraft charging in ice clouds, but magnesium which has
a low work function charges positively. These results
enable the charging of materials to be predicted before
flight, and also suggest that alloys of magnesium should
minimise aircraft charging. The laboratory apparatus
could be used to characterize the charging of the new
composite materials for aircraft surfaces.

DESCRIPTORS: (U) *Hydrogen, *Deuterium, *Reaction
kinetics, Distribution, Reactants(Chemistry), Collisions,
Energy, Photons, Laser beams, Reprints

IDENTIFIERS: (U) WUAFOSR2303B1, PE81102F

DESCRIPTORS: (U) *Ice, *Electrostatic charge, Particles,
Collisions, Aircraft, Charge transfer, Metals,
Precipitation static

IDENTIFIERS: (U) PE81102F, WUAFOSR2310A1

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AD-A142 541 7/4 9/1

AD-A142 541 CONTINUED

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

and NbSe₂ were studied.

(U) Thin Film Synthesis of Superconducting Chemical Compounds.

DESCRIPTIVE NOTE: Final rept. 1 Jan 81-30 Dec 83.

MAY 84 15P

PERSONAL AUTHORS: Sienko, M. J. ; Hoffmann, R. ; Newman, J. A. ; Bur1itch, J. M. ;

IDENTIFIERS: (U) PE81102F, WUAFQSR2308C1

CONTRACT NO. AFOSR-80-0009

PROJECT NO. 2308

TASK NO. C1

MONITOR: AFOSR
TR-84-0546

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was to define the chemical factors that affect onset of superconductivity in ternary compounds: to determine how small changes in stoichiometry and microstructure influence critical temperature, how the number and placing of magnetic ions act to quench superconductivity, and how the crystal structure can be modified to enhance superconductivity. The approach was to synthesize, from ultrapure starting elements, ternary borides, silicides, sulfides and selenides of the second and third row transition elements, to characterize the new compounds for x-ray structure, electric and magnetic behavior, and then compare them with doped materials. Four kinds of compounds were investigated: rare earth diosmium disilicides, rare earth osmium-iridium borides, layered structure transition metal dichalcogenides, and Chevrel type molybdenum ternaries. Both the rare earth osmium-iridium borides and rare earth diosmium disilicides were synthesized by arc melting. The crystal structures were refined and magnetic susceptibility studies revealed conventional Hund's rule behavior in the disilicides while the (Pr, Nd) (Os, Ir) 484 compounds are characterized by Van Vleck paramagnetism of closely spaced multiplets. Only LaOs₂Si₂ and LuOs₂Si₂ compounds are superconducting with T_c's in the 2-4K range. In the layered compounds, lithium intercalated ZrS₂, ZrSe₂, NbS₂,

DESCRIPTORS: (U) *Chemical compounds, *Ternary compounds, *Superconductors, *Thin films, *Synthesis, Stoichiometry, Microstructure, Crystal structure, Critical temperature, Transitions, Layers, Rare earth elements, Selenides, Sulfides, Borides, Paramagnetism, Electrical properties, Magnetic properties, Superconductivity, Structural properties, X rays

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A142 522 18/3 17/10

AD-A142 522 CONTINUED

ENSCD INC SPRINGFIELD VA SIGNAL ANALYSIS SYSTEMS DIV

(U) Analysis of Short-Period P-Coda Measurements for Presumed Underground Nuclear Explosions in Eurasia.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Jan 84,

APR 84 80P

PERSONAL AUTHORS: Baumgardt, D. R. ;

REPORT NO. SAS-TR-84-01

CONTRACT NO. F49620-83-C-0041, ARPA Order-4891

PROJECT NO. 4891

TASK NO. 3A

MONITOR: AFOSR
TR-84-0478

UNCLASSIFIED REPORT

ABSTRACT: (U) Characteristics of P-coda measurements at NORSAR were investigated for presumed underground nuclear explosions in the Soviet Union. For explosions in the Semipalatinsk region, coda magnitudes, measured in the time domain in 8-second windows averaged over 50 seconds of P coda, were found to vary by about 0.1 magnitude units across NORSAR as compared with about 0.2 to 0.3 units for P-wave magnitudes. Also, array-averaged estimates of coda magnitude varied more smoothly with time into the coda than single channel estimates. This result indicates that local subarray scattering causes random perturbations in coda levels which are smoothed out by the averaging process. NORSAR P-coda magnitudes, like the Lg measurements of Rindal (1983), are more consistent with network averaged P-wave magnitudes than NORSAR single-channel magnitudes. There is some indication that Lg measurements may be slightly better than P-coda measurements in terms of reducing scatter and bias. In the analysis of P-codas from seismic events north of the Caspian Sea, codas of presumed explosions in the Astrakhan region are more intense and variable as a function of time into the coda than those for events near Azgir. These differences are attributed to lateral variations in geologic structure in the Pri-Caspian salt basin.

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DESCRIPTORS: (U) *Nuclear explosion detection, *Seismic detection, Seismic data, Seismic waves, Scattering, Primary waves (Seismic waves), Surface waves, Discrimination, Yield (Nuclear explosions), Estimates, Underground explosions, USSR, Eurasia, Seismic arrays, Norway

IDENTIFIERS: (U) Body waves (Seismic waves), NORSAR (Norwegian Seismic Array), Semipalatinsk (USSR), Azgir-Astrakhan explosions, Codas (Seismic waves), Lg scattering, P coda magnitudes, Seismic magnitude, WJAF05R48913A10, PE61102F

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SEARCH CONTROL NO. EVLO8F

AD-A142 428 6/20

AD-A142 348 12/1

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

NORTH CAROLINA STATE UNIV RALEIGH DEPT OF MATHEMATICS

(U) Chemical and Molecular Biological Aspects of Alkylhydrazine-Induced Carcinogenesis in Human Cells in Vitro. Revised.

(U) Final Scientific Report, Grant Numbers AFOSR-81-0052, AFOSR-81-0052A and AFOSR-81-0052B.

DESCRIPTIVE NOTE: Final rept. 1 Jul 80-30 Sep 83,

DESCRIPTIVE NOTE: Final rept. 1 Jan 81-30 Apr 84,

APR 84 78P

APR 84 21P

PERSONAL AUTHORS: Witlak, D. T. ;

PERSONAL AUTHORS: Campbell, S. L. ;

CONTRACT NO. F49620-80-C-0086

CONTRACT NO. AFOSR-81-0052

PROJECT NO. 2312

PROJECT NO. 2304

TASK NO. A1

TASK NO. A8

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0479

TR-84-0451

UNCLASSIFIED REPORT

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ABSTRACT: (U) The syntheses for 1,1-(methyl-14C)-dimethylhydrazine, 1,2-(methyl-14C)-dimethylhydrazine, and the important metabolite of 1,2-dimethylhydrazine, namely, 14C-methylazoxymethanol as an acetate derivative are described. Materials for high specific activity were employed to (1) Investigate early events in carcinogenesis; (2) Study DNA modification and damage; and (3) Probe effects of anticarcinogen benzamide, on molecular perturbation of DNA by methylazoxymethanol acetate.

ABSTRACT: (U) The numerical and analytic solution of nonlinear singular systems of the form $Ax' + B(x) = f$ are studied. Numerical and analytic procedures are developed for several cases of interest. These results are applied to the analysis of semi-state circuit models, cheap control problems, and constrained path control problems. (Author)

DESCRIPTORS: (U) *Toxicity, *Methyl hydrazines, *Dimethylhydrazines, Carcinogenesis, Humans, Fibroblasts, Metabolites, Labeled substances, Deoxyribonucleic acids, Damage, Modification, Synthesis(Chemistry)

DESCRIPTORS: (U) *Numerical analysis, *Nonlinear systems, Differential equations, Solutions(General), Numerical methods and procedures, Circuits, Control, Paths

IDENTIFIERS: (U) Benzamide, Acetate/Methylazoxymethanol, LPN-OSURF-RF-782177/712880, PE81102F, WUAFOSR2312A1

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A8

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SEARCH CONTROL NO. EVL08F

AD-A142 348

12/1

ARMS CONTROL AND DISARMAMENT AGENCY WASHINGTON DC FIELD
OPERATIONS DIV

AD-A142 345

17/2

GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING

(U) Theory and Applications of Random Fields.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 83,

FEB 84

18P

PERSONAL AUTHORS: Adler, R. J. ;

CONTRACT NO. AFOSR-83-0068

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0458

UNCLASSIFIED REPORT

ABSTRACT: (U) The main results discussed in this final report include: (1) A discussion of the sample path behavior of chi-squared stochastic processes, with emphasis on the ways in which such processes exhibit non-normal behavior. (2) A discussion of the existence and path continuity of set indexed processes with independent increments. (3) Information on the distribution of suprema of random fields and empirical processes, with applications to stochastic modeling and statistical hypothesis testing. (Author)

DESCRIPTORS: (U) *Stochastic processes, Mathematical models, Abnormalities, Paths, Continuity, Hypotheses, Statistical tests

IDENTIFIERS: (U) *Random fields, PE81102F, WJAFOSR2304A5

AD-A142 348

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EVL08F

(U) A Procedure for Designing Exact Reconstruction Filter Banks for Tree-Structured Subband Coders.

DESCRIPTIVE NOTE: Technical rept.,

84 5P

PERSONAL AUTHORS: Smith, M. J. T. ; Barnwell, T. P. , III ;

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR
TR-84-0335

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the International Conference on Acoustics, Speech, and Signal Processing (1984).

ABSTRACT: (U) In recent years, tree-structured analysis/reconstruction systems have been extensively studied for use in subband coders for speech. In such systems, it is important that the individual channel signals be decimated in such a way that the number of samples coded and transmitted does not exceed the number of samples in the original speech signal. Under this constraint, the systems presented in the past have sought to remove the overall analysis/reconstruction distortion. In this paper, it is shown that it is possible to design tree-structured analysis/reconstruction systems which meet the sampling rate condition and which also result in exact reconstruction of the input signal. This paper develops the conditions for exact reconstruction and presents a general method for designing the corresponding high quality analysis and reconstruction filters. (Author)

DESCRIPTORS: (U) *Speech, *Signal processing, Coding, Recursive filters, Frequency, Distortion, Phase distortion, Input, Signals

IDENTIFIERS: (U) PE81102F, WJAFOSR2304A9

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

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GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING

HAYSTACK OBSERVATORY WESTFORD MA

(U) A Maximum-Likelihood Approach to Image Segmentation by
Texture.

(U) Multistation Measurements of High-Latitude Ionospheric
Convection.

DESCRIPTIVE NOTE: Technical rept.,

DEC 83 12P

84 5P

PERSONAL AUTHORS: Bevington, J. E. ; Mersereau, R. M. ;
Beaujardiere, O. ; Holt, J. ;

CONTRACT NO. DAAG29-81-K-0024

CONTRACT NO. AFOSR-83-0002

PROJECT NO. 2304

PROJECT NO. 2310

TASK NO. A8

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0337

TR-84-0483

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper addresses the problem of
segmenting an image by texture. Specifically, the
investigators are concerned with estimating the
trajectory of the boundary between the two regions
characterized by different two-dimensional
autocorrelation functions. An algorithm is developed
which is an approximation to a maximum-likelihood
estimator based on the assumption of Gaussian random
fields with known mean and covariance. Preliminary
experimental results are given. (Author)

DESCRIPTORS: (U) *Images, *Boundaries, Trajectories,
Autocorrelation, Functions(Mathematics), Two dimensional,
Approximation(Mathematics)

IDENTIFIERS: (U) Image segmentation, Gaussian fields,
Maximum likelihoods, Segmentation, Textures,
WUAFOSR2304A8, PE81102F

SUPPLEMENTARY NOTE: Pub. in Jnl. of Geophysical Research,
v88 nA12 p10,111-10,121, 1 Dec 83.

Reprint: Multistation Measurements of High-Latitude
Ionospheric Convection.

DESCRIPTORS: (U) *Ionospheric modification, High
latitudes, Convection(Atmospheric), Solar wind,
Magnetosphere, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2310A2

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FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM THEORY

JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) Interim Scientific Report, Air Force Grant AFOSR-82-0238, 1 June 1982-31 March 1983.

(U) Research on Nonlinear Control Theory.

MAR 83 8P

DESCRIPTIVE NOTE: Annual scientific rept. 1 Mar 83-29 Feb 84,

PERSONAL AUTHORS: Kalman, R. E. ;

MAR 84 5P

CONTRACT NO. AFOSR-81-0238

PERSONAL AUTHORS: Rugh, W. J. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-83-0079

TASK NO. A8

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0375

MONITOR: AFOSR

TR-84-0480

UNCLASSIFIED REPORT

ABSTRACT: (U) During this grant period a substantial amount of previously begun work was completed and many papers have been published. A complete listing of publications is contained in the report. There was also a marked increase in general center activities, due to expansion of the faculty and some concomitant increase in short- and long-term visitors. The research concentrated on the following areas: linear systems over rings; control-theoretic problems by polynomial methods; realization of covariance sequences; and noisy modeling. (Author)

DESCRIPTORS: (U) *Mathematics, Theory, Reports, Linear systems, Rings(Mathematics), Control, Polynomials, Covariance

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A8

UNCLASSIFIED REPORT

ABSTRACT: (U) This annual report briefly describes progress on research in non-linear control theory. Results reported include characterizations of the family of linearizations about constant operating points of non-linear systems described by transform-domain Volterra series, explicit formulas for the linearization of an interconnected system in terms of subsystem linearizations, and a characterization for linearization by feedback. Publications describing these results in detail are listed.

DESCRIPTORS: (U) *Control, Linearity, Theory, Nonlinear systems, Feedback, Reprints

IDENTIFIERS: (U) WUAFOSR2304A1, PE81102F

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SUSQUEHANNA RESOURCES AND ENVIRONMENT INC JOHNSON CITY
NY

RESEARCH INST OF COLORADO FORT COLLINS

(U) Applications of Texture Analysis for Rock Types
Discrimination.

(U) Conduct of the International Multigrid Conference.

DESCRIPTIVE NOTE: Final rept. 1 Jan-30 Sep 83.

DESCRIPTIVE NOTE: Final rept. Nov 82-Nov 83 on Phase 2.

FEB 84 58P

DEC 83 84P

PERSONAL AUTHORS: McCormick, S. ;

PERSONAL AUTHORS: Hsu, S. ;

CONTRACT NO. AFOSR-ISSA-83-00027, NASW-3773

CONTRACT NO. F49820-83-C-0029, ARPA Order-4288

PROJECT NO. 2304

MONITOR: AFOSR
TR-84-0477

TASK NO. A3

MONITOR: AFOSR
TR-84-0450

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A117 078.

UNCLASSIFIED REPORT

ABSTRACT: (U) Aimed at developing image processing methods for rock types analysis with LANDSAT data, numerous experiments were conducted using supervised and unsupervised classification techniques under the general concept of texture analysis with LANDSAT digital data covering two geological quads of Nevada. The results indicate that the supervised classification method is very effective in the extraction of granite regions when (1) data were in ratio format, (2) feature variables included both tone and texture information, and (3) the classifier is capable of handling non-normally distributed data. Classification errors occurred when there exists pixels of non-granite category whose spectral and textural properties are statistically similar to that of granite pixels. Two cases of errors can be noted: Type 1 pixels located at the periphery of the granite regions, and Type 2 pixels located far away from the core of the granite areas.

DESCRIPTORS: (U) *Rock, *Image processing, Digital systems, Aerial photography, Artificial satellites, Discrimination, Photographic texture, Photographic tone, Classification, Multiband spectral reconnaissance, Granite, Optical images, Texture

IDENTIFIERS: (U) Satellite photography

ABSTRACT: (U) The 1983 International Multigrid Conference was held at Colorado's Copper Mountain Ski Resort, April 5-8. It was organized jointly by the Institute for Computational Studies at Colorado State University, U.S.A., and the Gesellschaft fur Mathematik und Datenverarbeitung Bonn, F.R. Germany, and was sponsored by the Air Force Office of Sponsored Research and National Aeronautics and Space Administration Headquarters. The conference was attended by 80 scientists, divided by institution almost equally into private industry, research laboratories, and academia. Fifteen attendees came from countries other than the U.S. A. In addition to the fruitful discussions, the most significant factor of the conference was of course the lectures. The lecturers include most of the leaders in the field of multigrid research. The program offered a nice integrated blend of theory, numerical studies, basic research, and applications. Some of the new areas of research that have surfaced since the Kohn-Portz conference include: the 'algebraic multigrid approach; multigrid treatment of Euler equations for inviscid fluid flow problems; 3-D problems; and the application of MG methods on vector and parallel computers.

DESCRIPTORS: (U) *Information sciences, *Applied mathematics, Symposia, Research management, Algebraic functions, Approach, Differential equations, Inviscid flow, Three dimensional, Problem solving, Numerical

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methods and procedures, Grids, Vector analysis, Parallel processors, Computers, Computer programs, Finite element analysis, Finite difference theory, Bifurcation(Mathematics), Lectures, Questionnaires

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND STATISTICS

(U) Interim Scientific Report, Grant AFOSR-81-0171, 15 May 1981 - 14 May 1982,

IDENTIFIERS: (U) *Miltigrids, WUAFOSR2304A3, PE81102F

MAY 84 5P

PERSONAL AUTHORS: Bloom, F. ;

CONTRACT NO. AFOSR-81-0171

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-84-0474

UNCLASSIFIED REPORT

ABSTRACT: (U) The investigator focused on and produced papers with the following titles: 'On a damped nonlinear evolution equation,' 'Nonexistence of smooth electromagnetic fields in nonlinear dielectrics, I infinite cylindrical dielectrics,' and 'Nonexistence of smooth electromagnetic fields in nonlinear dielectrics, II shock development in a half space.' Details on this research are contained in the report.

DESCRIPTORS: (U) *Dielectrics, *Nonlinear systems, Electromagnetic fields, Shock

IDENTIFIERS: (U) Nonlinear dielectrics, WUAFOSR2304A4, PE81102F

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AD-A142 280 17/2 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS

GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL ENGINEERING

(U) Interim Scientific Progress Report for Grant AFOSR-82-0328, 1 October 1982 - 30 September 1983.

(U) Multichannel Linear Predictive Coding of Color Images.

FEB 84 9P

84 5P

PERSONAL AUTHORS: Kleitman, D. J. ;

PERSONAL AUTHORS: Maragos, P. A. ; Mersereau, R. W. ; Schafer, R. W. ;

CONTRACT NO. AFOSR-82-0328

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A7

TASK NO. A9

MONITOR: AFOSR
TR-84-0461

MONITOR: AFOSR
TR-84-0355

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the investigators produced 24 papers with 13 published and 11 submitted or in preparation. Titles include, 'Wafer scale integration of systolic arrays,' 'An approximation algorithm for Manhattan routing,' 'Bareil sets and circuit complexity,' 'A complexity theoretical approach to randomness,' 'Topological complete subgraphs of a random graph,' 'Largest component in the k-cube,' 'Sorting in clogn parallel steps,' and 'Parallel computation using meshes of trees.' (Author)

DESCRIPTORS: (U) *Algorithms, Integrated circuits, Network flows, Information systems, Problem solving, Computer aided design, Computations

IDENTIFIERS: (U) Systolic arrays, Fast algorithms, Manhattan routing, WUAFOSR2304A7, PE81102F

ABSTRACT: (U) This paper reports on a preliminary study of applying single-channel (scalar) and multichannel (vector) 2-D linear prediction to color image modeling and coding. Also, the novel idea of a multi-input single-output 2-D ADPCM coder is introduced. The results of this study indicate that texture information in multispectral images can be represented by linear prediction coefficients or matrices, whereas the prediction error conveys edge-information. Moreover, by using a single-channel edge-information the investigators obtained, from original color images of 24 bits/pixel, reconstructed images of good quality at information rates of 1 bit/pixel or less. (Author)

DESCRIPTORS: (U) *Coding, *Images, *Predictions, Colors, Linear systems, Coefficients, Multichannel, Multispectral

IDENTIFIERS: (U) Linear predictive coding, Models rates, WUAFOSR2304A9, PE81102F

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SEARCH CONTROL NO. EVLOBF

AD-A142 257

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VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT
OF ELECTRICAL ENGINEERING

(U) Soft Constraint Iterative Reconstruction from Noisy
Projections.

84

5P

PERSONAL AUTHORS: Seex, A. A. L. ;

CONTRACT NO AFOSR-82-0234

PROJECT NO 2304

TASK NO A2

MONITOR: AFOSR
TR-84-0458

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUB. In Proceedings, IEEE
International Conference on Acoustics, Speech, and Signal
Processing (ICASSP-84), 1984, 6-10, 1984, 6-10, 19-21 Mar 84

Summary: Soft Constraint Iterative Reconstruction from
Noisy Projections

DESCRIPTORS: (U) Signal processing, Signal to noise
ratio, Algorithms, Degrees of freedom, Reprints

IDENTIFIERS: (U) Frequency domain, WUAFOSR2304A2,
DEB-102F

AD-A142 255

17/2

12/1

VERMONT UNIV BURLINGTON DEPT OF COMPUTER SCIENCE AND
ELECTRICAL ENGINEERING

(U) Sensitivity Based Segmentation and Identification in
Automatic Speech Recognition.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Jul 83.

MAR 84

71P

PERSONAL AUTHORS: Absher, K. ;

CONTRACT NO. AFOSR-83-0053

PROJECT NO. 2304

TASK NO. D5

MONITOR: AFOSR
TR-84-0458

UNCLASSIFIED REPORT

ABSTRACT: (U) This research program continued an
investigation of sensitivity analysis and its use in the
segmentation and identification of the phonetic units of
speech, that was initiated during the 1982 Summer Faculty
Research Program. The elements of the sensitivity matrix,
which express the relative change in each pole of the
speech model to a relative change in each coefficient of
the characteristic equation, were evaluated for an
expanded set of data which consisted of six vowels
contained in single words spoken in a simple carrier
phrase by five males with differing dialects. The
objectives were to evaluate the sensitivity matrix,
interpret its changes during the production of the vowels,
and to evaluate inter-speaker variations. It was
determined that the sensitivity analysis (1) serves to
segment the vowel interval, (2) provides a measure of
when a vowel is on target, and (3) should provide
sufficient information to identify each particular vowel.
Based on the results presented, sensitivity analysis
should result in more accurate segmentation and
identification of phonemes and should provide a
practicable framework for incorporation of acoustic-
phonetic variance as well as time and talker
normalization. (Author)

DESCRIPTORS: (U) Speech recognition, Phonetics, Vowels.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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Speech analysis. Segmented. Dialects. Identification.
Words(Language). Coefficients. Phonemes. Acoustic signals.
Sensitivity. Mathematical analysis

WRIGHT STATE UNIV DAYTON OHIO DEPT OF CHEMISTRY

(U) Synthesis of a Series of Acetylene Terminated
Oligomers: Structure Property Relationships.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-31 Mar 84

MAP 84 100

PERSONAL AUTHORS: Kane J. D.

CONTRACT NO. WJ5878-0143

PROJECT NO. 0000

TASK NO. 70

MONITOR: MOSE-
73-84-0000

UNCLASSIFIED REPORT

ABSTRACT: (U) Key intermediates for the synthesis of a series of four bisacetylene aryl ether sulfones have been synthesized. The intermediates are the oligomeric bis-phenols resulting from nucleophilic aromatic substitution of 4,4'-dichlorodiphenyl sulfone with an excess of the salts of each of the following bis-phenols: 2,2-di-(4-hydroxyphenyl)perfluoropropane (IV), 4,4'-dihydroxybiphenylene (V), 4,4'-dihydroxydiphenyl ether (VI), and 4,4'-dihydroxydiphenyl methane (VII). Two of the resulting oligomeric bis-phenols (those arising from IV and VI) were converted to bis aryl bromides by the Ullman ether synthesis with excess amounts of m-dibromobenzene. (Author)

DESCRIPTORS: (U) *Synthesis(Chemistry), *Sulfones, *Aryl ethers, Phenols, Nucleophilic reactions, Aromatic compounds, Substitution reactions, Chlorine, Phenyl radicals, Salts, Hydroxyl radicals, Fluorine, Propane, Benzophenones, Methanes, Bromides, Benzene

IDENTIFIERS: (U) Oligomers, PE81102F, WJAFOSR2303D9

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SEARCH CONTROL NO. EVL06F

AD-A142 251 12/1

AD-A142 250 9/2

GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERINGGEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING(U) A Graph Theoretic Technique for the Generation of
Systolic Implementations for Shift-Invariant Flow
Graphs.(U) Morphological Skeleton Representation and Coding of
Binary Images.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Technical rept.,

84 5P

84 5P

PERSONAL AUTHORS: Schwartz, D. A. ; Barnwell, T. P. , III ;

PERSONAL AUTHORS: Maragos, P. A. ; Schafer, R. W. ;

CONTRACT NO. DAAG29-81-K-0024

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A9

TASK NO. A9

MONITOR: AFOSR
TR-84-0354MONITOR: AFOSR
TR-84-0347

UNCLASSIFIED REPORT

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ABSTRACT: (U) This paper presents a general method for the transformation of algorithms described by shift-invariant fully-specified flow graphs into equivalent systolic realization. The method consists of a set of rules for the systematic manipulation of the flow graphs into systolic form utilizing a set of theorems from graph theory. It is shown that many of the previously published systolic algorithms and many new algorithms can be generated using this single procedure. (Author)

ABSTRACT: (U) This paper presents a preliminary study on using Mathematical Morphology to represent and code a binary or a grey-tone image by parts of its skeleton, a thinned version of the image. An image can be uniquely decomposed into skeleton, a thinned version of the image. An image can be uniquely decomposed into skeleton components, and then reconstructed by dilating these components. Since, for a certain category of imagery, the skeleton components possess a lower entropy than the original image, a run-length or entropy coding scheme can be used to achieve representation or transmission of the image at a lower information rate than originally required. (Author)

DESCRIPTORS: (U) *Graphs, *Theory.
Transformations(Mathematics), Flow charting, Algorithms,
Theorems

DESCRIPTORS: (U) *Images, *Coding, Mathematics, Entropy,
Morphology, Data rate, Skeleton, Parts

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A9

IDENTIFIERS: (U) Binary images, Morphological
representation, Transmission, PE61102F, WUAFOSR2304A9

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DREXEL UNIV PHILADELPHIA PA DEPT OF ELECTRICAL AND
COMPUTER ENGINEERING

IDENTIFIERS: (U) PEB1102F. WUAFOSR2304D9

(U) An Information-Theoretic Approach to Target Estimation
of a Laser Radar Tracking System.

IAC NO. GC-840842

IAC DOCUMENT TYPE: GACIAC - MICROFICHE --

DESCRIPTIVE NOTE: Final research rept. 1 Nov 81-31 Oct 82.

IAC SUBJECT TERMS: G--(U)Laser tracking,

Tracking(position), High energy lasers, Laser radar,
Filters, Algorithms, Gint, Computer programs, Estimation,
Errors, Kalman filters, Mathematical models, Control
systems, Numerical solution, Numerical methods,
Parametric analysis.;

JAN 84 52P

PERSONAL AUTHORS: Kalata, P. R. ;

CONTRACT NO. AFOSR-82-0110

PROJECT NO. 2004

TASK NO. D9

MONITOR: AFOSR
TR-84-0489

UNCLASSIFIED REPORT

ABSTRACT: (U) High energy laser systems with highly
accurate measurements as target tracking sensors use a
conical scan process to obtain a target capture and
tracking within the narrow beamwidth. This searching
process and the target tracking algorithm are major
factors in the performance of the laser radar/target
tracking system. Previous research results use
information-theoretic concepts in establishing a laser
radar/target tracking performance bound independent of
the filtering algorithm. A computer program was developed
to calculate the lower bound of the estimation error due
to the non-linear gaussian glint measurement process.
Applying the Extended Kalman filter to the angle
estimation problem for a gaussian glint measurement
process, the resulting filter is found to have a
structure consisting of a series of demodulations with
gains adaptively determined by the resulting angle
estimate. The optimal performance of this estimation
process is shown to be dependent on the angle and a bound
on the performance as well as a numerical algorithm is
presented. (Author)

DESCRIPTORS: (U) *Pulsed lasers, *Optical radar, *Laser
tracking, High energy, Computer programs, Algorithms,
Filters, Estimates, Targets, Angles

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AD-A142 246 12/1

COLUMBIA UNIV NEW YORK DEPT OF APPLIED PHYSICS AND
NUCLEAR ENGINEERING

(U) Investigation of Three Dimensional Mesh Generation
With Precise Controls.

DESCRIPTIVE NOTE: Interim rept. 1 May 82-30 Sep 83.

FEB 84 9P

PERSONAL AUTHORS: Eisenman, P. R. ; Chu, C. K. ;

CONTRACT NO. AFOSR-82-0178

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-84-0462

UNCLASSIFIED REPORT

ABSTRACT: (U) Under the first period of the grant support, mathematical developments were performed on transformations, adaptive, surface, and orthogonal transformations. Algebraic transformations were extended by forming Boolean sums of multisurface transformations and by appropriate compositions. Lifting the results to curved 2-D surfaces. Orthogonal trajectories were a major part of the general development of orthogonal transformations under the grant support. Additional parts included field methods. This report summarizes progress made in these areas and lists publications resulting from the research. (Author)

SCRIPTORS: (U) *Three dimensional, *Mesh, *Algebra, *transformations(Mathematics), Surfaces, Orthogonality, Trajectories, Control, Precision, Curves(Geometry), Two dimensional, Boolean algebra, Field theory(Algebra), *Coordinates, Adaptive systems, Triangles, Algorithms

IDENTIFIERS: (U) PB81102F, WJAFOSR2304A3

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STANFORD UNIV CA COMPUTER SYSTEMS LAB

(U) Runtime Detection and Description of Deadness Errors
in Ada Tasking.

DESCRIPTIVE NOTE: Program analysis and verification group
rept. no. 22.

NOV 83 82P

PERSONAL AUTHORS: Helmbold, D. ; Luckham, D. C. ;

REPORT NO. TR-83-249

CONTRACT NO. N00039-82-C-0250, AFOSR-83-0355

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-84-0464

UNCLASSIFIED REPORT

ABSTRACT: (U) A runtime monitoring system for detecting and describing tasking errors in Ada programs is presented. Basic concepts for classifying tasking errors called deadness errors, are defined. These concepts indicate which aspects of an Ada computation must be monitored in order to detect deadness errors resulting from attempts to rendezvous or terminate. They also provide a basis for the definition and proof of correct detection. Descriptions of deadness errors are given in terms of the basic concepts. The monitoring system has two parts: (1) a separately compiled runtime monitor that is added to any Ada source text to be monitored, and (2) a pre-processor that transforms the Ada source text so that necessary descriptive data is communicated to the monitor at runtime. Some basic preprocessing transformations and an abstract monitoring for a limited class of errors were previously presented.

SCRIPTORS: (U) *Monitoring, *preprocessing, *transformations, *Computer programming, Limitations, Detection, Predictions, Errors, Abstracts

IDENTIFIERS: (U) Ada, Concurrent programming, Runtime, Deadlocks, PB81102F, WJAFOSR2304A2

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVLOSF

AD-A142 233 12/1 20/8

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Analytic Solutions to Two-State Collision Problems for
the Case of Exponential Coupling.

MAY 84 10P

PERSONAL AUTHORS: Lee, H. W.; George, T. F.;

CONTRACT NO. AFOSR-82-0048

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-84-0484

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v29 r5
p2509-2517 May 84.

Reprint: Analytic Solutions to Two-State Collision
Problems for the Case of Exponential Coupling.

DESCRIPTORS: (U) *Analytic functions, *Particle
collisions, *Atoms, *Exponential functions, *Couplings,
Hamiltonian functions, Matrices(Mathematics),
Mathematical models, Transitions, Cross sections,
Reprints

IDENTIFIERS: (U) Fine structure transitions, PE81102F,
WUAFOSR2303A2

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CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL
ENGINEERING AND COMPUTER SCIENCES

(U) Output Distributions of Electrons in a Photomultiplier.

APR 84 8P

PERSONAL AUTHORS: Helstrom, C. W.;

CONTRACT NO. AFOSR-82-0343

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0452

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v55
n7 p2786-2792, 1 Apr 84.

Reprint: Output Distributions of Electrons in
Photomultiplier.

DESCRIPTORS: (U) *Photomultiplier tubes, Electrons,
Staging, Reprints

IDENTIFIERS: (U) Complex planes, Dynodes, Numerical
integration

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MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION
AND DECISION SYSTEMS

ADVANCED INFORMATION AND DECISION SYSTEMS MOUNTAIN VIEW
CA

(U) Interim Technical Report, Grant AFOSR-82-0135, 15
March 1983 to 14 March 1984,

(U) An Informal Study of Program Comprehension.

MAY 84 20P

DESCRIPTIVE NOTE: Final technical rept. no. 2, 1 Jun 82-
31 May 83.

PERSONAL AUTHORS: Mitter, S. K.; Levy, B.;

MAR 84 63P

REPORT NO. LIDS-IR-1374

PERSONAL AUTHORS: Domeshek, E. A.; Shapiro, D. G.; Dean, J.
S.; McCune, B. P.;

CONTRACT NO. AFOSR-82-0135

REPORT NO. AI/DS-TM-1014-3

PROJECT NO. 2304

CONTRACT NO. F49620-81-C-0067

TASK NO. A1

PROJECT NO. 2304

MONITOR: AFOSR

TR-84-0473

TASK NO. A7

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0309

ABSTRACT: (U) Research was carried out on the following
main topics: 1. Linear and Nonlinear Filtering and
related Scattering and Inverse Scattering Problems; and 2.
Stochastic Control with Partial Observations. Technical
details of the research may be found in the reports,
theses, and papers cited in the references. A list of
publications supported wholly or partially by this grant
is included at the end of this report.

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes work performed
during the second year of research on a Program Reference
Language. During this year, a study was conducted in
which protocols of programmers studying a new program
(with the intent of debugging it) were analyzed, both for
the vocabulary used and for indications of strategies
adopted in their efforts at program comprehension. A
sampling of programmers' natural vocabulary for
referencing programs was gathered and analyzed.
Preliminary steps were taken towards using this data as
the basis for the design of a formal query language for
the PRL. The study also raised some new issues bearing on
the implementation systems which use the PRL: individual
differences imply the need for customization; context-
sensitive information management is important; and useful
user interface features were identified (Author)

DESCRIPTORS: (U) *Nonlinear systems, *Linear filtering,
*Inverse scattering, *Stochastic control, Observation,
Tables(Data), Theses Documents

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A1

DESCRIPTORS: (U) *Programming languages, *Information
systems, Comprehension, Models, Artificial Intelligence,
Vocabulary

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A7

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DTIC REPORT BIBLIOGRAPHY

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GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING

PITTSBURGH UNIV PA INST FOR COMPUTATIONAL MATHEMATICS AND
APPLICATIONS

(U) Increasing the Parallelism of Filters Through
Transportation to Block State Variable Form.

(U) The Maximum Principle for Bilinear Elements.

DESCRIPTIVE NOTE: Technical rept..

84 5P

PERSONAL AUTHORS: Schwartz, D. A.; Barnwell, T. P., III ;
Christie, I. ; Hall, C. ;

84 5P

PERSONAL AUTHORS: Schwartz, D. A.; Barnwell, T. P., III ;

CONTRACT NO. DAAG29-81-K-0024

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

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TASK NO. A3

TASK NO. A9

MONITOR: AFOSR
TR-84-0471

MONITOR: AFOSR
TR-84-0350

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The block state variable form is
investigated as a technique to increase the parallelism
of a filter. This increase parallelism allows more
parallel processors to be usefully applied to the problem,
resulting in a faster processing rate than is possible in
the unblocked form. Upper and lower bounds on the sample
period bound and the number of processors required to
support it are determined. (Author)

DESCRIPTORS: (U) *Parallel processors, *Digital filters,
*Parallel processing, Rates, Signal processing, Blocking

IDENTIFIERS: (U) *State variables, *Block state variable
form, PEB1102F, WUAFOSR2304A9

SUPPLEMENTARY NOTE: Pub. in International Jnl. for
Numerical Methods in Engineering, v20 p549-553 1984.

Reprint: The Maximum Principle for Bilinear Elements.

DESCRIPTORS: (U) *Boundary value problems, Finite
element analysis, Reprints

IDENTIFIERS: (U) Maximum principle, Bilinear elements

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PRINCETON UNIV NU DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

RANDOM APPLICATIONS INC MONTROSE CO

(U) Characterizing Innovations Realizations for Random
Processes,

(U) Applications of Differential Phase Statistics to
Studies of C3 and Spread Spectrum Communications.

84 15P

DESCRIPTIVE NOTE: Interim rept. 1 May 83-30 Apr 84.

PERSONAL AUTHORS: Schwartz, C. A.; Dickinson, B. W.; Sontag,
E. D.;

MAY 84 4P

PERSONAL AUTHORS: Pawula, R. F.;

CONTRACT NO. AFOSR-80-0198, NSF-ECS82-05772

CONTRACT NO. F49620-83-C-0085

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A6

TASK NO. A6

MONITOR: AFOSR
TR-84-0459

MONITOR: AFOSR
TR-84-0463

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Stochastics, v11 p159-172
1984.

Reprint: Characterizing Innovations Realizations for
Random Processes.

DESCRIPTORS: (U) *Pseudo random systems, Computer
applications, Linear filtering, Theorems, Reprints

IDENTIFIERS: (U) Stationary processes, Random processes,
Discrete-time random processes

ABSTRACT: (U) Five papers have been prepared under this contract in which recently developed differential phase statistics have been successfully employed to obtain error rate performance of differential modulation systems operating under practical conditions. These practical conditions included power imbalance, phase-change offset, noise correlations and intersymbol interference. The modulation systems considered were binary conventional and symmetric DPSK, offset DPSK, and M-ary DPSK. The channels studied were both terrestrial and satellite. Closed form expressions, requiring some numerical integration, were obtained in all cases. Extensive performance curves showing the effects of the various impairments were presented. Because satellite link performance depends strongly upon the qualities of the uplink, as shown, it was concluded that a satellite repeater is much less effective than a detect and remodulate transponder in a severe jamming environment. Asymptotic approximations to M-ary DPSK were shown to be extremely good, and it was suggested that more emphasis be placed on such methods as opposed to the more traditional, but much less accurate, use of bounds. (Author)

DESCRIPTORS: (U) *Statistics, *Communication and radio systems, Spread spectrum, Modulation, Errors, Rates, Rates, Noise(Radio), Correlation, Intersymbol

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Interference, Radio links, Communication satellites

TEXAS TECH UNIV LUBBOCK DEPT OF CHEMISTRY

IDENTIFIERS: (U) Differential phase statistics, PE81102F
WUAFOSR2304A6

(U) Infrared Matrix Isolation Spectra of the H₂F₂ Dimer

MAR 84 17P

PERSONAL AUTHOR: Pedington, R. L. (Hawthorn, R. L.)

CONTRACT NO: AFOSR-78-0816

PROJECT NO: 2003

TASK NO: B1

MONITOR: AFOSR
TR-EM-0400

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Publ. in Jnl of Chemical Physics, 1980
n6 p2446-2461 15 Mar 84

Reprint: Infrared Matrix Isolation Spectra of the H₂F₂ Dimer.

DESCRIPTORS: (U) *Infrared spectra, *Hydrogen fluoride,
*Dimers, Band spectra, Hydrogen bonds, Argon, Nitrogen,
Carbon monoxide, Vibrational spectra, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

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SEARCH CONTROL NO. EVL06F

AD-A142 202

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GEORGIA INST OF TECH ATLANTA

(U) Artificial Intelligence Applied to Spectrum Estimation.

DESCRIPTIVE NOTE: Technical rept..

84

5P

PERSONAL AUTHORS: Gaby, J. E.; Hayes, M. H. ;

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR
TR-84-0348

UNCLASSIFIED REPORT

ABSTRACT: (U) Many techniques are available for the estimation of the power spectrum of a stationary random process. While power spectrum estimation is a problem which falls within the domain of signal processing, the problem of inferring information falls within the domain of artificial intelligence (AI). With a wide variety of different types of power spectrum estimation techniques to choose from, an equally wide range of differing spectral estimates may be produced. Each estimate, however, may be used to infer information about the time series. By defining an appropriate knowledge base, a system is being developed to infer information from power spectrum estimates. This system combines the estimates produced by a variety of current spectrum estimation techniques in order to formulate a composite spectral estimate. (Author)

DESCRIPTORS: (U) *Power spectra, *Signal processing, Estimates, Artificial intelligence, Signal to noise ratio

IDENTIFIERS: (U) Spectrum estimation, PE81102F
WUAFOSR2304A9

AD-A142 202

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9/4

12/1

GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING

(U) An Iterative Method for Restoring Noisy Blurred Images.

DESCRIPTIVE NOTE: Technical rept..

84

5P

PERSONAL AUTHORS: Katsaggelos, A. K.; Blemond, J. ;
Mersereau, R. M.; Schafer, R. W. ;

CONTRACT NO. DAAG29-81-K-0024

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR
TR-84-0353

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper introduces a new iterative image restoration method which is capable of restoring noisy, blurred images by incorporating a priori knowledge about the image and noise statistics into the iterative procedure. The iteration equation consists of a prediction part which is based on a noncausal image model description and an innovation part which is weighted by a gain factor. The gain is computed using a linear MSE optimization procedure and is updated at each step of the iteration. This image restoration scheme can be interpreted as an iterative procedure with a statistical constraint on the image data.

DESCRIPTORS: (U) *Image restoration, *Iterations, *Statistics, *Noise, Models, Gain, Images, Equations

IDENTIFIERS: (U) Gaussian blurs, PE81102F, WUAFOSR2304A9

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

FRITZ PEAK OBSERVATORY BOULDER CO

(U) Abelian Integrals and Bifurcation Theory.

(U) Mesospheric Wind Determinations and the P1(2)c,d Lines of the X 2 P1 OH (8-3) Band,

DESCRIPTIVE NOTE. Technical rept.

MAY 84 5P

APR 84 47P

PERSONAL AUTHORS: Hernandez, G ; Smith, J. L. ;

PERSONAL AUTHORS: Carr, J. ; Chow, S. N. ; Hale, J. K. ;

CONTRACT NO. AFOSR-ISSA-84-00016

REPORT NO. LCDS-84-7

PROJECT NO. 2310

CONTRACT NO DAAG23-83-K-0023, AFOSR-81-0198

TASK NO. A2

PROJECT NO. 2304

MONITOR: AFOSR TR-84-0485

TASK NO. 17

MONITOR: AFOSR TR-84-0465

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Prepared in cooperation with Michigan State Univ., East Lansing and Heriot-Watt Univ., Edinburgh, Scotland. Sponsored in part by Grants NSF-MCS82-01768 and NSF-MCS82-05355.

SUPPLEMENTARY NOTE: Pub. in Geophysical Research Letters, v11 n5 p534-537 May 84.

Reprint: Mesospheric Wind Determinations and the P1(2)c,d Lines of the X 2 P1 OH (8-3) Band.

ABSTRACT: (U) Conditions are given for uniqueness of limit cycles for autonomous equations in the plane. The results are applicable to codimension two bifurcations near equilibrium points for vector fields. (Author)

DESCRIPTORS: (U) *Mesosphere, Wind, Line spectra, Emission spectra, Fabry Perot interferometers, Atmospheric tides, Reprints

DESCRIPTORS: (U) *Integrals, *Bifurcation(Mathematics), Theory, Equations, Equilibrium(General), Vector analysis

IDENTIFIERS: (U) *Abelian integrals, Autonomous equations, Limit cycles, Uniqueness, PE61102F, WUAFOSR2304A1

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A2

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BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

COLORADO UNIV AT BOULDER INST OF COGNITIVE SCIENCE

(U) AFOSR Interim Scientific Report, Grant AFOSR-81-0116.

(U) Modification of Current Feedback Strategies: A Text Synthesis Approach.

DESCRIPTIVE NOTE: Interim rept. 30 Jun 82-29 Jun 83,

DESCRIPTIVE NOTE: Final rept.

FEB 84

10P

MAR 84

58P

PERSONAL AUTHORS: Kushner, H. J. ;

PERSONAL AUTHORS: Lajgen, P. ; Keenan, V. ;

CONTRACT NO. AFOSR-81-0118

CONTRACT NO. AFOSR-83-0149

PROJECT NO. 2304

PROJECT NO. 2313

TASK NO. A1

TASK NO. D3

MONITOR: AFOSR
TR-84-0455MONITOR: AFOSR
TR-84-0481

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: The report summarizes progress in research supported by the grant during this period in the following areas: (1) stochastic control under partial observations; (2) nonlinear filtering; (3) large deviations for nearly deterministic processes; and (4) transition and invariant densities for nearly deterministic diffusions. A list of papers resulting from the research effort is included. (Author)

DESCRIPTORS: (U) *Research management *Mathematical analysis Stochastic control Mathematical filters Nonlinear systems Determinants(Mathematics) Density Invariance Transitions

IDENTIFIERS: (U) PES11021 WUAFOSR2304A1

ABSTRACT: (U) Two passages, each consisting of a 19 and 19 sentence version, were constructed from the same passage on the development of the atom bomb. The passage sentences are individually typed on index cards. The four resulting bundles were then scrambled. Subjects were undergraduate psychology students at the University of Colorado who received one of the four scrambled bundles. Sentences 5, 11, 17, and 18 were reconstructed at the beginning using a slotted board. In the feedback condition, subjects were given five tokens to indicate if a card had been appropriately placed. The post-feedback students did not receive any assistance in determining the correct placement. In both conditions subjects signalled when they thought they were finished. The dependent measures were time (in minutes), number of moves, percentage with the author's original order of sentences, percentage recall (the number of idea units recalled), and percentage recognition (choosing the original sentence from a pair containing a paraphrase). The recall and recognition measures were given directly after completion of the task. The independent variables were feedback, feedback, content, and number of sentences.

DESCRIPTORS: (U) *Feedback, Strategy, Cognition, Information processing, Recognition, Words(Language)

IDENTIFIERS: (U) PES1102F WUAFOSR2313D9

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GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL
ENGINEERING

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION
RESEARPCB

(U) Procedures for Signal Reconstruction from Noisy Phase.

(U) Evidence Accumulation for Spatial Reasoning.

DESCRIPTIVE NOTE: Technical rept.

DESCRIPTIVE NOTE: Technical rept.

84 5P

MAR 84 80P

PERSONAL AUTHORS: Thomas, D. M.; Hayes, M. H.;

PERSONAL AUTHORS: Matsuyama, T.; Hwang, V. S.; Davis, L.
S.;

CONTRACT NO. DAAG29-91-K-0024

PROJECT NO. 2304

REPORT NO. CAR-TR-54 OS-TR-1381

TASK NO. A9

CONTRACT NO. F49620-82-C-0082

MONITOR: AFOSR
TR-84-0349

TASK NO. A2

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0468

ABSTRACT: (U) In this paper a class of iterative procedures is presented for reconstructing a finite duration sequence from noisy samples of its Fourier transform phase. These measurements are combined with a knowledge of the true transform magnitude and/or hard constraints on the phase noise variations to define sets whose intersection must contain the true sequence. The algorithms iterate between the known domain and the transform domain applying the known constraints (i.e., finite duration and known limits on phase variation) in each domain. Results of an experimental investigation are presented. A method is described for the case where limits on both the magnitude and phase variation of a finite length sequence are known. (Author)

DESCRIPTORS: (U) *Noise, *Signal processing, Finite element analysis, Sequences, Fourier transformation, Iterations, Algorithms, Time

IDENTIFIERS: (U) Signal reconstruction, PE81102F,
WUAFOSR2304A3

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UNCLASSIFIED REPORT

ABSTRACT: (U) In a previous report the authors described the organization of an aerial image analysis system. There are three levels of representation and control in that system: A High Level Expert (HLE) that utilizes a symbolic hierarchical model for the possible spatial organization of objects in the image to build partial, local interpretations of the image and to determine where to further analyze the image and what analyses to perform; a Model Selection Expert that determines, on the basis of contextual information provided by the HLE, the most promising appearance descriptions to use in searching for objects and structures in the image; and a Low Level Vision Expert that finds pictorial entities that satisfy these appearance descriptions by selecting image processing methods to find the appropriate entities. Emphasis has been on the High Level Expert, which is based on a general method of 'evidence accumulation' to perform flexible spatial reasoning. This paper contains a detailed description of the evidence accumulation process and its associated consistency checking process.

DESCRIPTORS: (U) *Reasoning, *Spatial distribution, *Aerial photography, *Image processing, *Automation, *Photointerpretation, Mathematical models

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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IDENTIFIERS: (U) *Evidence accumulation, WUAFOSR2304A2,
PEB1102F

FLORIDA UNIV GAINESVILLE DEPT OF MATHEMATICS

(U) The Development of a Mathematical Foundation for
Cellular Image Processing.

DESCRIPTIVE NOTE: Final rept. 1 Mar 83-29 Feb 84,

FEB 84 22P

PERSONAL AUTHORS: Ritter, G. X. ;

CONTRACT NO. AFOSR-83-0065

PROJECT NO. 2304

TASK NO. D9

MONITOR: AFOSR
TR-84-0472

UNCLASSIFIED REPORT

ABSTRACT: (U) The primary result of this research effort has been the development of an image algebra that can serve as the foundation of a common algebraically based image processing language. In comparison to other existing image algebras, this algebra is capable of expressing common image processing algorithms and transforms in terms of its operators. (Author)

DESCRIPTORS: (U) *Image processing, *Mathematics, *Cells, *Algebra, Photointerpretation, Images, Algorithms, Language, Operators(Mathematics), Transformations(Mathematics)

IDENTIFIERS: (U) WUAFOSR2304D9, PEB1102F

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FLORIDA UNIV GAINESVILLE DEPT OF MATHEMATICS

KENTUCKY UNIV LEXINGTON WENNER-GREN RESEARCH LAB

(U) Identifiability and Problems of Model Selection in Econometrics.

(U) Response of the Cardiovascular System to Vibration and Combined Stresses.

82 41P

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 83.

PERSONAL AUTHORS: Kalman, R. E. ;

NOV 83 208P

CONTRACT NO. AFOSR-76-3034

PERSONAL AUTHORS: Knapp, C. F. ; Evans, J. M. ; Randall, D. C. ; Charles, J. B. ; Kelley, B. S. ;

PROJECT NO. 2304

CONTRACT NO. F49620-83-K-0002

TASK NO. A6

PROJECT NO. 2312

MONITOR: AFOSR TR-84-0454

TASK NO. A1

UNCLASSIFIED REPORT

MONITOR: AFOSR TR-84-0482

SUPPLEMENTARY NOTE: Pub. in Advances in Econometrics, pt5 ch8 p169-207 1982.

UNCLASSIFIED REPORT

Reprint: Identifiability and Problems of Model Selection in Econometrics.

ABSTRACT: (U) Contents: Heart Rate Responses of Humans to Sinusoidally Varying + or - 1 Gz Gravitational Stress; A new chronically instrumented animal preparation in which heart rate (via AV sequential pacing) can be computer controlled in either an open or closed-looped manner; Cardiovascular Responses of Untrained and Endurance Trained Dogs to Oscillatory Blood Volume Shifts; and Changes in Peak Left Ventricular Wall Stress in Normal and Cardiac Denervated Canines During Sinusoidal Acceleration.

DESCRIPTORS: (U) *Economic models, *Econometrics, Selection, Identification, Parameters, Reprints

DESCRIPTORS: (U) *Stress(Physiology), *Vibration, *Cardiovascular system, *Acceleration tolerance, Physiological effects, Response(Biology), Heart rate, Blood volume, Ventricles

IDENTIFIERS: (U) WJAFOSR2304A6, PEB1102F

IDENTIFIERS: (U) WJAFOSR2312A1, PEB1102F

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RENSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION RESEARCH

(U) Controllability for a Class of Nondiagonal Hyperbolic Distributed Bilinear Systems,

(U) Parallel Image Processing and Image Understanding.

DESCRIPTIVE NOTE: Interim rept. 1 Apr 83-31 Mar 84,

84 21P

APR 84 7P

PERSONAL AUTHORS: Stenrod, M. ;

PERSONAL AUTHORS: Rosenfeld, A. ;

CONTRACT NO. AFOSR-81-0172

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A7

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0486

TR-84-0457

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Mathematics and Optimization, v11 p57-76 1984.

ABSTRACT: (U) During this period, the eight investigators produced 10 papers with titles including Reliability in cellular arrays through data sharing, Interactive software systems for computer vision, On mapping homogeneous graphs on a linear array processor model, A parallel method for natural texture synthesis, and Embedding of networks of processors into hypercubes. (Author)

Reprint: Controllability for a Class of Nondiagonal Hyperbolic Distributed Bilinear Systems.

DESCRIPTORS: (U) *Linear algebraic equations, *Control systems, Operators(Mathematics), Hilbert space, Wave equations, Reprints

IDENTIFIERS: (U) Hyperbolic equations, WUAFOSR2304A1, PE81102F

DESCRIPTORS: (U) *Image processing, *Parallel processing, *Photointerpretation, Cells, Arrays, Images, Embedding, Networks, Computer programs

IDENTIFIERS: (U) Computer vision, PE81102F, WUAFOSR2304A7

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SYSTEMS CONTROL TECHNOLOGY INC PALO ALTO CA

CORNELL UNIV ITHACA NY

(U) Adaptive Decentralized Control

(U) Gallium Arsenide and Related Compounds, 1982. An International Symposium 10th Held at Albuquerque New Mexico on 18-22 September 1982.

DESCRIPTIVE NOTE: Author Rept. Jun 82-Jul 83.

129

DESCRIPTIVE NOTE: Final Rept. 1 Jul 82-10 Jun 83

PERSONAL AUTHORS: Friedlander, B. J.

03 650P

CONTRACT NO. 349820-81 C-0051

PERSONAL AUTHORS: Stillman, D. J.

PROJECT NO. 1004

CONTRACT NO. AFOSR-82-0260

TASK NO. A8

PROJECT NO. 2306

MONITOR: AFOSR

TASK NO. B1

TR-84-0453

MONITOR: AFOSR
TR-84-0500

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This annual report summarizes some preliminary results of a research effort directed towards the development of adaptive decentralized control systems. The adaptive controller in such a system must operate in the presence of unmodeled dynamics. An input-output approach is presented for analyzing the global stability and robustness properties of adaptive controllers under such circumstances. Conditions for guaranteeing global stability of the error system associated with the adaptive controller, and ensuring boundedness of the adaptive gains, are derived. Specific bounds are presented for certain signals in the control systems. (Author)

Availability: The Institute of Physics, Techno House, Redcliffe Way, Bristol BS1 6NX & 47 Belgrave Square, London, England, PC \$40.00 (No copies furnished by DTIC/NTIS).

ABSTRACT: (U) This is a volume of contributed papers delivered at the International symposium on Gallium Arsenide and Related Compounds. The technical program of the conference included sessions on bulk and epitaxial crystal growth, optoelectronic devices, microwave devices, ion implantation, and characterization. Improvements in the preparation of high purity undoped semi-insulating GaAs were reported, along with considerable discussion of the EL2 electron trap in this material. Advances in bulk InP growth and the growth of bulk III-V alloys were presented. Research on GaAs, InP, and alloy high frequency and optoelectronic devices demonstrated increasingly sophisticated structures, including modulation-doped heterostructure charge-coupled devices.

DESCRIPTORS: (U) *Numerical methods and procedures, *Adaptive control systems, *Decentralization, Closed loop systems, Global, Stability, Input output processing, Dynamics

IDENTIFIERS: (U) ADCON(Adaptive Decentralized Control), Robust procedures, PE81102F, WUAFOSR2304AS

DESCRIPTORS: (U) *Semiconductor devices, *Gallium arsenides, *International, *Symposia, Epitaxial growth, Crystal growth, Ion implantation, Electrooptics, High frequency, Alloys, Group III compounds, Group V compounds, Microwave equipment, Indium phosphides

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

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IDENTIFIERS: (U) WUAFOSR230681, PE61102F

RANDOM APPLICATIONS INC MONTROSE CO*

(U) Asymptotics and Error Rate Bounds for M-ary DPSK
(Differential Phase-Shift Keying).

JAN 84 3P

PERSONAL AUTHORS: Pawula, R. F. ;

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-84-0338

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Communications, vCOM-32 n1 p93-94 Jan 84.

Reprint: Asymptotics and Error Rate Bounds for M-ary DPSK
(Differential Phase-Shift Keying).

DESCRIPTORS: (U) *Approximation(Mathematics),
*Asymptotic normality, *Error analysis, Phase modulation,
Frequency modulation, Phase shift keyers, Inequalities,
Reprints

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

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ROCHESTER UNIV NY DEPT OF CHEMISTRY

NEW YORK ACADEMY OF SCIENCES NY

(U) Molecular Rate Processes and Their Interaction with Laser Radiation.

(U) Immune Networks.

DEC 83 134P

DESCRIPTIVE NOTE: Final rept..

DEC 83 404P

PERSONAL AUTHORS: Yuan, J. M.; DeVries, P. L.; Lam, K. S.; George, T. F.;

PERSONAL AUTHORS: Bona, C. A.; Kohler, H.;

CONTRACT NO. AFOSR-82-0046

CONTRACT NO. AFOSR-83-0012

PROJECT NO. 2303

PROJECT NO. 2312

TASK NO. A2

TASK NO. A5

MONITOR: AFOSR
TR-84-0318

MONITOR: AFOSR
TR-84-0393

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Progress in Physics (Nanjing), v3 n4 p417-459 Dec 83. Text in English and Chinese. Supersedes AD-A121 031.

Availability: The New York Academy of Sciences, 2 East 83rd St., New York, NY 10021 HC \$80.00 (No copies furnished by DTIC/NTIS).

Reprint: Molecular Rate Processes and Their Interaction with Laser Radiation.

ABSTRACT: (U) The International Conference on Immune Networks was held on 30 November - 1 December 1982. The discovery of idiotypes in humans by Dr. Kunkel and the discovery of idiotypes in the rabbit by Dr. Udén, as well as the formulation of the immune network concept by Dr. Jerne, has had a fundamental impact on the thinking of scientists interested in the area of the structure of immunoglobulin, the generation of antibody diversity, and the regulation of immune responses. The program of this meeting covered various aspects of the immune network with particular emphasis on the new theoretical developments in this concept. Also discussed was the idotype-determined regulation in various antigens, and parallel sets. The final session was devoted to the understanding of the mechanism responsible for the alteration in the communication between clones bound by idotype links in various diseases.

DESCRIPTORS: (U) *Lasers, *Radiation, *Molecular properties, *Rates, Reaction kinetics, Chemical reactions, Degrees of freedom, Quantum theory, Excitation, Surface properties, Laser beams, Dynamics, Molecular properties, Collisions, Ionization, Energy transfer, Reprints, Translations, China

IDENTIFIERS: (U) PE81102F, WUAFOSR2303A2

DESCRIPTORS: (U) *Immunology, *Symposia, Networks, Immunity, Antibodies, Antigens, Immunoglobulins

IDENTIFIERS: (U) Idiotypes, Clones, PE81102F, WUAFOSR2312A5

AD-A142 034

AD-A141 984

UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 919

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STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Resolution of the A/B Photoionization Branching Ratio
Paradox for the C1202(+) B(000) State,

MAR 84 25P

PERSONAL AUTHORS: Johnson, M. A. ; Zare, R. N. ; Rostas, J. ;
Leach, S. ;

CONTRACT NO. F49620-83-C-0033

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0429

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80
n6 p2407-2428, 15 Mar 84.

Reprint: Resolution of the A/B Photoionization Branching
Ratio Paradox for the C1202(+) B(000) State.

DESCRIPTORS: (U) *Photoionization, *Electronic states,
*Ratios, *Photoelectron spectra, *Fluorescence, *Carbon
dioxide, Rotation, Ultraviolet spectra, Excitation,
Lasers, Reprints

IDENTIFIERS: (U) Branching ratio, PE81102F,
WUAFOSR2303B1

AD-A141 919

UNCLASSIFIED

AD-A141 889

20/5

12/1

MICHIGAN STATE UNIV EAST LANSING DIV OF ENGINEERING
RESEARCH

(U) Computer Modeling of Pulsed Chemical Lasers.

DESCRIPTIVE NOTE: Final rept. 1 Nov 79-31 Oct 83.

DEC 83 278P

PERSONAL AUTHORS: Kerber, R. L. ;

REPORT NO. MSU-ENGR-84-004

CONTRACT NO. AFOSR-80-0003

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0424

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Doctoral thesis.

ABSTRACT: (U) A computer modeling study of pulsed H2+F2
and D2+F2 chemical lasers has been conducted. This work
was directed toward understanding the role of kinetic
rotational relaxation and vibrational-rotational
relaxation mechanisms in HF and DF lasers. This study
resulted in very comprehensive computer models that could
predict spectral characteristics of pulsed laser
performance using kinetics rate equation data and
experimental conditions. In addition, experiments were
conducted on a flash initiated pulsed H2+F2 laser
facility to generate data to compare with the models
developed in this study. Models were also developed that
demonstrated the performance of pulsed laser driven
amplifiers and optical resonance transfer lasers. Finally,
simple models were constructed that permit efficient
prediction of pulse energy and pulse power. (Author)

DESCRIPTORS: (U) *Pulsed lasers, *Mathematical models,
*Chemical lasers, *Computerized simulation, Mathematical
prediction, Hydrogen fluoride lasers, Vibrational spectra,
Deuterium compounds, Fluorides, Kinetics, Relaxation,
Rotation, Amplifiers, Power, Pulses, Test facilities

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 889 CONTINUED

AD-A141 873 20/4

IDENTIFIERS: (U) PE81102F, WUAFOSR230381

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF
AEROSPACE ENGINEERING

(U) Perturbed Free Shear Layers.

84 60P

PERSONAL AUTHORS: Ho, C. M.; Huerre, P. ;

CONTRACT NO. N00014-77-C-0314, F49820-82-K-0019

MONITOR: AFOSR
TR-84-0547

UNCLASSIFIED REPORT

Availability: Pub. in Annual Review of Fluid Mechanics,
v16 p385-424 1984 (No copies furnished by DTIC/NTIS).

Reprint: Perturbed Free Shear Layers.

DESCRIPTORS: (U) *Fluid flow, *Shear properties, *Free
stream, Layers, Surfaces, Thickness, Mixing, Inviscid flow,
Stability, Homogeneity, Incompressible flow, Two
dimensional flow, Jet flow, Aerodynamic noise, Turbulent
flow, Vortices, Boundary layer, Reprints

IDENTIFIERS: (U) Shear flow

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 886 11/2 20/11 12/1

AD-A141 856 12/1 22/2 9/2

COLORADO UNIV AT BOULDER DEPT OF CIVIL ENVIRONMENTAL AND
ARCHITECTURAL ENGINEERING

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) Identification of Strain-Softening Properties and
Computational Predictions of Localized Fracture.

(U) An Integrated, Optimization-Based Approach to the
Design and Control of Large Space Structures.

DESCRIPTIVE NOTE: Annual rept. Aug 82-Feb 84.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Oct 83-1 May
84.

MAR 84 191P

MAY 84 21P

PERSONAL AUTHORS: William, K. J.; Sture, S.; Bicanic, N.;
Christensen, J.; Hurlbut, B.;

PERSONAL AUTHORS: Polak, E.; Pister, K. S.; Taylor, R. L.;

CONTRACT NO. AFOSR-82-0273

CONTRACT NO. AFOSR-83-0361

PROJECT NO. 2307

PROJECT NO. 2304

TASK NO. C2

TASK NO. A6

MONITOR: AFOSR
TR-84-0423

MONITOR: AFOSR
TR-84-0448

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The main objective of the present investigation is to evaluate strain-softening formulations for contained fracture in cementitious materials such as concrete and geo-materials. This report includes two principal developments: a rational approach to identify softening properties due to tensile cracking and frictional slip from displacement controlled material testing, and a systematic verification of contained fracture computations from small-scale structural testing. To this end, a composite damage model is proposed to describe the degradation of strength and stiffness in the post-peak regime with the aid of a volume fraction formulation of localized damage within a finite element.

ABSTRACT: (U) The investigators proposed to consider the design of large space structures which are required to perform large amplitude maneuvers at the end of which they are required to remain locked on a target. They proposed to deal with the pointing of the LSS in two stages. In the first stage, the control task is to rapidly redirect the pointing direction of the LSS reference axis, e.g., the line-of-sight of a telescope or antenna, by open loop optimal control, the large motions of the LSS induced by the maneuver must quiet down so that the control of the LSS can be transferred to a linear, closed loop control system. The task of the latter is to damp out the induced structural vibrations, and, finally, to lock the pointing direction on the target. For the purpose of obtaining a tractable model problem for the research, the investigators shall initially assume that the LSS is a beam. The investigators shall use a nonlinear beam model for the large motions, and they shall use a linear beam model to describe the small displacements as a perturbation around the equilibrium rigid body configuration. In the future, developing the model problem, described within the investigators shall first develop the equations of motion for a beam under large and small displacement conditions. They shall then use the resulting equations in transcribing sample design specifications into infinite

DESCRIPTORS: (U) *Cements, *Concrete, *Fracture(Mechanics), *Softening *Strain(Mechanics), *Structures, *Computations, Mathematical prediction, Finite element analysis, Cracking(Fracturing), Crack propagation, Tensile properties, Modulus of elasticity, Shear stresses, Plastic deformation, Displacement, Degradation, Rupture, Mechanical properties, Structural response Equations, Test methods

IDENTIFIERS (U) PE61102F, WUAFOSR2307C2

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AD-A141 855 CONTINUED SEARCH CONTROL NO. EVL06F

AD-A141 855 CONTINUED

SYSTEMS OF INEQUALITIES (Author)

DESCRIPTORS: (U) *Mathematical models, Equations of motion, *Solid bodies, *Beams, Structural, *Aiming, *Targeting, Control systems, Optimization, Line of sight, Vibration, Displacement, Computerized simulation, Space systems

IDENTIFIERS: (U) *LLS (Large Space Structure), *B81102F, *WUAFOSR2304A6

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

DESCRIPTORS: (U) *Research in Computer Simulation of Integrated Circuits.

DESCRIPTIVE NOTE: Final report : Oct 81-31 Jul 83.

JUL 83 457

PERSONAL AUTHORS: Newton, A. R. *Pederson D. D. ;

CONTRACT NO. AFOSR-82-0021

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-84-0447

UNCLASSIFIED REPORT

ABSTRACT: (U) The performance of the new LSI simulator CLASSIE is evaluated on several circuits with a few hundred to over one thousand semiconductor devices. A more accurate run time prediction formula has been found to be appropriate for circuit simulators. The design decisions for optimal performance under the constraints of the hardware (CRAY-1) are presented. Vector computers have an increased potential for fast, accurate simulation at the transistor level of Large-Scale-Integrated Circuits. Design considerations for a new circuit simulator are developed based on the specifics of the vector computer architecture and of LSI circuits. The simulation of Large-Scale-Integrated (LSI) circuits requires very long run time on conventional circuit analysis programs such as SPICE2 and super-mini computers. A new simulator for LSI circuits, CLASSIE, which takes advantage of circuit hierarchy and repetitiveness, and array processors capable of high-speed floating-point computation are a promising combination. While a large number of powerful design verification tools have been developed for IC design at the transistor and logic gate levels, there are very few silicon-oriented tools for architectural design and evaluation.

DESCRIPTORS: (U) *Integrated circuits, *Computerized simulation, *Digital computers, Circuits, Floating point operation, Processing equipment, Logic circuits, Circuit analysis, Gates (Circuits), Formulations, Semiconductor

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

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AD-A141 808 12/1

devices, Architecture, Scalars, Vector analysis, Arrays, Transistors, Predictions, Computers, Hierarchies

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS
(U) Research in Stochastic Processes.

IDENTIFIERS: (U) Classic computer program, LSI(Large Scale Integration), Speed(High), PE81102F, WUAFOSR230581

DESCRIPTIVE NOTE: Scientific rept. 1 Nov 81-31 Oct 82.

DEC 82 74P

PERSONAL AUTHORS: Cambanis, S. ; Carroll, R. J. ; Kallianpur, G. ; Leadbetter, M. R. ;

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0449

UNCLASSIFIED REPORT

ABSTRACT: (U) This document contains papers in these two areas: RESEARCH IN STOCHASTIC PROCESSES; and RESEARCH IN ROBUST ESTIMATION IN LINEAR MODELS.

DESCRIPTORS: (U) *Stochastic processes, *Research management, Reports, Estimates, Linearity, Mathematical models

IDENTIFIERS: (U) Robust procedures, PE81102F, WUAFOSR2304A5

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AD-A141 808

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL06F

AD-A141 803 7/3

AD-A141 798 21/5 20/4

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

IOWA STATE UNIV AMES ENGINEERING RESEARCH INST

(U) New Approaches to the Synthesis of Novel Organosilanes.

(U) Aerodynamic Design and Performance of a Two-Stage, Axial-Flow Compressor (Baseline).

DESCRIPTIVE NOTE: Final rept. 1 Sep 80-31 Dec 83.

DESCRIPTIVE NOTE: Technical rept. 1 Oct 78-30 Nov 82.

OCT 83 18P

DEC 83 204P

PERSONAL AUTHORS: Boudjouk, P. ;

PERSONAL AUTHORS: Hathaway, M. D. ; Oklitski, T. H. ;

CONTRACT NO. AFOSR-80-0239

REPORT NO. ISU-ERI-AMES-84178, TCRL-24

PROJECT NO. 2303

CONTRACT NO. F49620-83-K-0023

TASK NO. B2

PROJECT NO. 2307

MONITOR: AFOSR

TR-84-0439

UNCLASSIFIED REPORT

ABSTRACT: (U) Three major efforts in organosilicon chemistry were initiated during the tenure of this grant: 1) synthetic organosilicon electro-chemistry; 2)

synthetic applications of Lewis Acid catalyzed redistribution reaction; and, 3) synthetic applications of ultrasonic waves. All three projects were successful to varying degrees. In electrochemistry, the first electrochemical characterizations of functionalized organosilanes was carried out and will be submitted for publication during 1984. Additionally, the first syntheses of a variety of disilanes from chlorosilanes under controlled potential conditions was affected. The redistribution reaction was successfully applied to prepare cyclic and caged silanes. A wide variety of cyclics were synthesized in good yield. Ultrasonic irradiation of heterogeneous reactions was found to greatly accelerate reaction rates giving a narrow distribution of products in high yields. Improved yields under milder conditions for many reactions were observed. (Author)

DESCRIPTORS: (U) *Synthesis(Chemistry), *Organic compounds, *Silanes, Ultrasonics, Electrochemistry, Catalysis, Acids, Chemical reactions, Chlorosilanes, Cyclic compounds, Heterogeneity, Rates, Reaction time

IDENTIFIERS: (U) Redistribution reactions, Cage structures, PE81102F, WUAFOSR2303B2

AD-A141 803

AD-A141 798

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UNCLASSIFIED REPORT

ABSTRACT: (U) A two-stage, baseline configuration, low-speed, axial-flow research compressor was designed, built and tested at design flow. The design, fabrication and data acquisition and reduction details are described. Time-averaged, spatially detailed and overall flow and aerodynamic performance data for design flow operation of the compressor are presented and discussed. (Author)

DESCRIPTORS: (U) *Axial flow compressors, Aerodynamic characteristics, Axial flow compressor blades, Geometry, Data acquisition, Base lines, Stators, Guide vanes

IDENTIFIERS: (U) PE81102F, WUAFOSR2307A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOBF

AD-A141 793 21/5

AD-A141 793 CONTINUED

IOWA STATE UNIV AMES ENGINEERING RESEARCH INST

LPN-ERI-1490, LPN-ERI-1845

(U) Stator Blade Row Geometry Modification Influence on Two-Stage, Axial-Flow Compressor Aerodynamic Performance.

DESCRIPTIVE NOTE: Technical rept. 1 Oct 78-30 Apr 83.

DEC 83 260P

PERSONAL AUTHORS: Tweedt, D. L.; Okilishi, T. H. ;

REPORT NO. ISU-ERI-AMES-84179, TCRL-25

CONTRACT NO. F49620-83-K-0023

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR
TR-84-0418

UNCLASSIFIED REPORT

ABSTRACT: (U) The influence of stator row geometry modification on the aerodynamic performance of a two-stage, low-speed, axial-flow research compressor was assessed in the experiments described in this project. Stator geometry modifications tested included stator leading edge forward symmetrical sweep, large-radius blade/annulus wall corner fillets, and stator hub gap sealing (shrouding). Comparisons were made between detailed aerodynamic data associated with baseline and modified configurations. Substantial stator exit flow-field changes attributable to symmetrical sweeping of stator leading edges and to hub clearance sealing were observed with some evidence of corresponding near end wall loss reduction. The effects of large radii filleting were less clear. Interesting conclusions about the off-design flow rate performance of the compressor also resulted from consideration of experimental data. (Author)

DESCRIPTORS: (U) Axial flow compressors, Modification, Stators, Aerodynamic characteristics, Geometry, Flow fields, Axial flow compressor blades, Turbomachinery, Leading edges

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A4, LPN-ERI-1394.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 788

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STEVENS INST OF TECH HOBOKEN N J

(U) Applications of the Scanning Electron Microscope to Concrete Failure (Axial, Biaxial, and Dynamic).

DESCRIPTIVE NOTE: Final rept. 1 Sep 80-31 Aug 83,

MAR 84 101P

PERSONAL AUTHORS: Derucher, K. ;

CONTRACT NO. AFOSR-80-0256

PROJECT NO. 2307

TASK NO. C2

MONITOR: AFOSR
TR-84-0431

UNCLASSIFIED REPORT

ABSTRACT: (U) The major objective was to directly observe the formation and/or propagation of microcracks in concrete (plain and reinforced) both before and after applications of axial, biaxial, and dynamic stress fields. As part of this objective, procedures, techniques, apparatus, and equipment were developed and/or modified for the study of concrete fracture utilizing the Scanning Electron Microscope (SEM). In addition, information regarding microcracks, propagation of these microcracks (concrete failure), aggregate shape, plain and reinforced concrete, the sum effect of various stress fields, and the ultimate strength of concrete was found. Information regarding microcracks, aggregate shape, plain and reinforced concrete, the sum effects of various stress fields, and the ultimate strength of concrete was found for concrete containing blended cements. Concrete may fail from applied service loads or applied stress fields whether they are axial, biaxial, or dynamic. Also, concrete may fail as a result of volume changes such as the hydration of the cement paste leading to the shrinkage microcracks or to various cycles of wetting and drying or temperature variations (freezing and thawing). Thus, a model previously developed was investigated and the equations developed were found to be appropriate.

DESCRIPTORS: U *Concrete. *Failure. *Electron microscopes. *Electronic scanners. Microcracking.

AD-A141 788

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AD-A141 788 CONTINUED

Reinforced concrete, Biaxial stresses, Stresses, Fracture(Mechanics), Strength(Mechanics), Cements Hydration, Shrinkage, Freezing, Thawing, Drying, Wetting

IDENTIFIERS: (U) PE61102F, WUAFDSR2307C2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 780 11/6 20/11

AD-A141 777 11/8

CREVEL UNIV PHILADELPHIA PA DEPT OF MATERIALS
ENGINEERING

BATTELLE COLUMBUS LABS OH

JR A Fundamental Study of P/M Processed Bimetallic
Temperature Aluminum Alloys

(U) Molecular Order and Solidification Processes in
Organic Liquids and Solutions

DISSEMINATION NOTE Annual Technical Report 1977-1978

DESCRIPTIVE NOTE 1978 1979 1980

33

34

11p

MADE IN THE U.S.A.

PERSONAL AUTHORS: JAYROSEN, V. CHESON, W. R.

BOOK REVIEWED BY: JAYROSEN, V. KODZAK, M. J.

CONTRACT NO. AFOSR-00-198

PROJECT NO. 1980

PROJECT NO. 2303

PROJECT NO. 1980

TASK NO. A2

DATE 11/6

MONITOR: AFOSR

AD-A141 780

TR-84-0425

11/6 1980

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: Powder processed Al-Fe-Ni alloys containing 10-15% Al₂O₃ dispersoids in the range 0.2-0.3 μm in size are being examined with respect to their mechanical behavior. The microstructure, microstructural stability, and elevated temperature tensile and creep behavior are overall objective is to establish a comprehensive and quantitative fundamental understanding of the microstructure relations in this new class of powder processed materials. The design guidelines with respect to service stresses and temperatures. To date, microstructural characterization, dispersoid stability, creep resistance and creep resistance have been characterized. The data and observations confirm the benefits of rapid solidification in providing levels of structural stability and mechanical strength in long-term service at temperatures up to 1000°C. The design of the alloy is being the L-S-W theory of solid solution strengthening kinetics even at high temperatures.

ABSTRACT: A study of aluminum alloys, powder metallurgy, microstructural properties, high temperature, microstructure, mechanical properties, creep strength, physical, mechanical properties, powder alloys, nickel alloys.

AD-A141 780 11/6 20/11 1980 AFOSR20006A1

AD-A141 780

AD-A141 777

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ABSTRACT: (U) Purpose of this program was to study behavior of lubricants subjected to high temperatures and pressures as in ball bearings. Solutions of organic acids in hydrocarbons were selected as prototype lubricants and a diamond anvil high pressure cell was used for the observations. SHORT AND LONG RANGE ORDER STUDIES-Past studies have indicated the possibility of aggregation of acid molecules at high, but constant pressure. In order to check this observation, equipment was needed to precisely and to rapidly obtain both pressure measurements and infrared spectra. Accordingly, a combination microscope and beam condenser stage for the high pressure cell was constructed. We determined that at high pressure acid aggregation was occurring. But the pressure measurements indicated that the pressure was slightly increasing, probably due to gasket extrusion. Thus the increased hydrogen bonding or aggregation was a result of this slight pressure increase. Long range order was tested by means of polarized infrared spectra. No changes in the dichroism ratio were detected indicating no evidence of long range order. KINETIC AND REACTION MECHANISM STUDIES showed a small amount of monomer formation at elevated temperatures. Only after monomer appeared did salt formation commence and then the rate of organic salt formation appeared to be proportional to the rate of monomer formation, indicating that salt was formed from the monomer.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 777 CONTINUED

AD-A141 741 20/2

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER
(U) Single Crystal Growth of Ferroelectric Tungsten Bronze
Compositions for SAW Applications.

DESCRIPTORS: (U) *Lubricants, *High temperature, *High
pressure, *Molecular properties, *Solidification, Organic
compounds, Salts, Infrared spectra, Polarization, Organic
Monomers, Synthesis(Chemistry), Acids, Hydrocarbons

DESCRIPTIVE NOTE: Final rept. 28 Jul 82-31 Dec 83,

FEB 84 38P

IDENTIFIERS: (U) Molecular order, PE81102F,
WUAFOSR2303A9

PERSONAL AUTHORS: Neurgaonkar, R. R. ;

REPORT NO. SC5348.1FR

CONTRACT NO. F49620-82-C-0078

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-84-0435

UNCLASSIFIED REPORT

ABSTRACT: (U) Ferroelectric tungsten bronze single
crystals were grown by the Czochralski technique. The
crystals belong to the tetragonal point group 4mm with
spontaneous polarization parallel to the 'c' axis. Room
temperature dielectric and piezoelectric measurements
indicated that the k 15 and d 15 coefficients are
significantly larger for these bigger unit cell bronzes
as compared to the smaller unit cell bronzes, e.g. SBN,
SKN, etc. The results of this study indicated that since
the piezoelectric properties of these crystals are better
than SBN, it is expected that these composition crystals
should show better acoustical properties. As reported
earlier, SBN crystals are known to possess excellent
acoustical properties and are useful for device
application. Hence, this opens up further new interest in
this family of crystals for potential use in SAW device
applications. (Author)

DESCRIPTORS: (U) *Crystal growth, *Single crystals,
*Ferroelectric materials, *Bronze, *Tungsten alloys,
Acoustic waves, Piezoelectric crystals, Acoustic
equipment, Surface acoustic wave devices

IDENTIFIERS: (U) PE81102F, WUAFOSR2306B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 691

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AD-A141 691 CONTINUED

TENNESSEE UNIV KNOXVILLE DEPT OF CIVIL ENGINEERING

(U) A Study of Thermal Properties and the Heating Process
in Asphaltic Concrete.

DESCRIPTORS: (U) *Asphalt, *Heating, Removal, Pavements,
Concrete, Mixtures, Thermal Properties, Mathematical
models

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-31 Dec 83.

IDENTIFIERS: (U) *Asphaltic concrete, PE61102F

FEB 84 158P

PERSONAL AUTHORS: Hightler, W. H. ; Krane, R. J. ; Wall, D. J. ;

CONTRACT NO. AFOSR-82-0250

PROJECT NO. 2307

TASK NO. C2

MONITOR: AFOSR
TR-84-0432

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this study were to model the surface heating of asphaltic concrete pavements and to investigate the thermal properties (conductivity, specific heat, and diffusivity) of asphaltic concrete. The thermal properties of six laboratory prepared asphaltic concrete mixes at three asphalt contents were determined. As a result of testing four or five replicate samples of each of the eighteen mix combinations, it was concluded that average values of specific heat and diffusivity, independent of asphalt content but dependent on aggregate gradation and mineralogy, could be used. Conductivity varied with asphalt content as well as aggregate type and gradation. A parameter study using the transient heat transfer model which employed radiant and convection heating of the pavement surface and conduction through the asphaltic concrete indicated that: without exceeding the flash point of asphaltic concrete, it typically takes a field heater 25-35 minutes to heat the pavement at a depth of 25 mm to a temperature sufficient for easy removal (this was verified by field test); combined convection-thermal radiation heating is more efficient than radiant heating, and; the best surface heating strategy is to operate the heater at a temperature such that the pavement reaches its maximum allowable temperature just as the desired temperature is reached at the prescribed removal depth without using insulation periods (soaking) between heat applications.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 886

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AD-A141 886 CONTINUED

COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC
SCIENCE

Monsoons, Cyclones

IDENTIFIERS: (U) Tibetan Plateau, Western region(United
States), WUAFDSR2310A1, PEB1102F

(U) The Hierarchy of Motion Systems over Large Plateaus.

DESCRIPTIVE NOTE: Research papers,

MAR 84 20P

PERSONAL AUTHORS: Reiter, E. R. ; Tang, M. ; Shen, R. ;

REPORT NO. CSU-RP-37

CONTRACT NO. AFOSR-82-0182, NSF-ATM-81-09504

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-84-0445

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the International
Symposium on the Qinghai-Xizang (Tibet) Plateau and
Mountain Meteorology, 20-24 Mar 84, China. Sponsored in
part by Grants NAGW-601.

ABSTRACT: (U) Motion systems of various scales are
caused by the differential heating of plateaus and the
surrounding plains. On the largest scales, monsoonal
systems and their interannual variability are considered.
Comparisons are made between the effects of the Western
Plateau of North America and the Plateau of Tibet.
Synoptic-scale systems are strongly affected by the
plateaus of the northern hemisphere. An example of
cyclogenesis over Eastern Tibet is given through a
numerical experiment. During heating effects of the
Western Plateau of North America cause a large-scale
plateau circulation system to develop. This system has a
decisive impact on the diurnal variability of
thunderstorm activity over the plateaus and over the
plains to the east. It is shown that local heating and
cooling by detailed topographic features can interact
with the diurnal plateau circulation system.

DESCRIPTORS: (U) *Atmospheric motion, *Plateaus,
Troposphere, Circulation, Barometric pressure, Wind,

AD-A141 886

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 681 20/8 7/5

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Studies on Lifetime Measurements and Collisional Processes in an Inductively Coupled Argon Plasma Using Laser Induced Fluorescence.

84

7P

PERSONAL AUTHORS: Uchida, H.; Kosinski, M. A.; Omenetto, N.; Winefordner, J. D.;

CONTRACT NO. F49620-80-C-0005

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-84-0438

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Spectrochimica Acta, v38 n1 p63-68 1984.

Reprint: Studies on Lifetime Measurements and Collisional Processes in an Inductively Coupled Argon Plasma Using Laser Induced Fluorescence.

DESCRIPTORS: (U) *Plasmas(Physics), *Argon, *Laser induced fluorescence, Excitation, Atoms, Ions, Collisions, Measurement, Coupling(Interaction), Quantum chemistry, Efficiency, Reprints

IDENTIFIERS: (U) Lifetimes, PE81102F, WJAFOSR2303A1

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AD-A141 688

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AD-A141 688 12/1 9/2

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) The *(-) Minimax Search Procedure for Trees Containing Chance Nodes.

83

25P

PERSONAL AUTHORS: Ballard, B. W.;

MONITOR: AFOSR
TR-84-0359

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Artificial Intelligence, v21 p327-350 1983.

Reprint: The *(-) Minimax Search Procedure for Trees Containing Chance Nodes.

DESCRIPTORS: (U) *Minimax technique, *Game theory, *Probability, *Nodes, *Searching, *Information retrieval, Trees, Algorithms, Random variables, Order statistics, Reprints

IDENTIFIERS: (U) Minimax trees, WJAFOSR2304A2, PE81102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 663 20/2 7/4 20/5

AD-A141 651 7/3

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMISTRY

(U) Spatially Resolved Concentration Studies of Ground State Atoms in A Flame. Saturated Absorption Spectroscopic Method.

(U) Synthesis of 2,2',5,5'-Tetramethylbibismole. A Thermochromic Dibismuthine,

84 7P

84 3P

PERSONAL AUTHORS: Walters, P. E. ; Lanauze, J. ; Winefordner, J. D. ;

PERSONAL AUTHORS: Ashe, A. J. , III ; Drone, F. J. ;

CONTRACT NO. F49620-80-C-0005

CONTRACT NO. AFOSR-81-0089

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A1

TASK NO. B2

MONITOR: AFOSR TR-84-0437

MONITOR: AFOSR TR-84-0442

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Spectrochimica Acta, v39B n1 p125-129 1984.

SUPPLEMENTARY NOTE: Pub. in Organometallics, v3 p495-498 1984.

Reprint: Spatially Resolved Concentration Studies of Ground State Atoms and Ions in an ICP: Saturated Absorption Spectroscopic Method.

Reprint: Synthesis of 2,2',5,5'-Tetramethylbibismole. A Thermochromic Dibismuthine.

DESCRIPTORS: (U) *Flames. *Atoms. *Ground state. *Spectroscopy, Resolution, Atomic properties, Absorption, Laser beams, Dye lasers, Excitation, Saturation, Probes, Perturbations, Plasma diagnostics, Reprints

DESCRIPTORS: (U) *Synthesis (Chemistry), *Thermochromic materials, *Bismuth compounds, *Organometallic compounds, Chemical reactions, Iodine compounds, Sodium, Butyl radicals, Lithium compounds, Liquid ammonia, Reprints

IDENTIFIERS: (U) PE81102F, WJAFOSR2303A1

IDENTIFIERS: (U) Dibismuthines, Bibismole/2,2',5,5'-tetramethyl, PE81102F, WJAFOSR2303B2

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SEARCH CONTROL NO. EVL08F

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AD-A141 638 12/1 9/3

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM THEORY

(U) Evidence for Rapid Optical Variations of the Quasi-Stellar Radio Source 4C 29.45,

(U) Decoupling of Linear Systems by Dynamic Output Feedback,

FEB 84 6P

84 24P

PERSONAL AUTHORS: Grauer, A. D. ;

PERSONAL AUTHORS: Hammer, J. ; Khargonekar, P. P. ;

REPORT NO. CONTRIB-181

CONTRACT NO. DAAG29-80-C-0050, AFOSR-76-3034

CONTRACT NO. AFOSR-82-0192

MONITOR: ARO, AFOSR 15077.23-MA, TR-84-0733

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR TR-84-0408

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Astrophysical Jnl., v277 n1 p77-81, 1 Feb 84.

Reprint: Evidence for Rapid Optical Variations of the Quasi-Stellar Radio Source 4C 29.45.

Availability: Pub. in Mathematical Systems Theory, v17 p135-157 1984 (No copies furnished by DTIC/NTIS).

Reprint: Decoupling of Linear Systems by Dynamic Output Feedback.

DESCRIPTORS: (U) *Linear systems, *Decoupling, Feedback, Output, Matrices(Mathematics), Reprints

DESCRIPTORS: (U) *Quasars, Radio sources(Astronomy), Photometry, Reprints

IDENTIFIERS: (U) PEG1102F, WJAFOSR2311A1

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OTIC REPORT BIBLIOGRAPHY

AD-A141 838 7/4

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

(U) Vibrational Energy Disposal in Polyatomic Ion-Molecule Reactions: $\text{SF}_6(-) + \text{H}_2\text{D Yields SF}_6(-) + \text{HF}(v), \text{DF}(v)$.

MAR 84 10P

PERSONAL AUTHORS: Hamilton, C. E.; Bierbaum, V. M.; Leone, S. R. ;

CONTRACT NO. F48620-83-C-0013

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0411

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n5 p1831-1838, 1 Mar 84.

Reprint: Vibrational Energy Disposal in Polyatomic Ion-Molecule Reactions: $\text{SF}_6(-) + \text{H}_2\text{D Yields SF}_6(-) + \text{HF}(v), \text{DF}(v)$

DESCRIPTORS: (U) *Polyatomic molecules, *Ions, *Chemical reactions, *Vibrational spectra, Sulfur, Hydrogen fluoride, Chemiluminescence, Afterglows, Energy transfer, Reaction kinetics, Infrared spectra, Reprints

IDENTIFIERS: (U) WUAFOSR2303B1, PE81102F

SEARCH CONTROL NO. EVLO8F

AD-A141 819 7/3

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

(U) Theoretical Studies of Polyvinyl-Substituted Carbenium and Silylenium Ions.

MAR 84 5P

PERSONAL AUTHORS: Truong, T.; Gordon, M. S.; Boudjouk, P. ;

CONTRACT NO. AFOSR-80-0239

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0440

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v3 n3 p484-487 1984.

Reprint: Theoretical Studies of Polyvinyl-Substituted Carbenium and Silylenium Ions.

DESCRIPTORS: (U) *Ions, *Carbenes, *Silicon compounds, *Vinyl radicals, *Substitution reactions, Polymers, Stabilization, Electric charge, Carbon, Cations, Chemical bonds, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B2

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A141 618

3/2

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

(U) The Pulsating Central Star of the Planetary Nebula Kohoutek 1-18.

FEB 84 8P

PERSONAL AUTHORS: Grauer, A. D. ; Bond, H. E. ;

REPORT NO. CONTRIB-179

CONTRACT NO. AFOSR-82-0192, NSF-AST80-17054

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0405

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Astrophysical Jnl., v277 p211-215, 1 Feb 84.

Reprint: The Pulsating Central Star of the Planetary Nebula Kohoutek 1-18.

DESCRIPTORS: (U) *Nebulae, Stars, Photometry, Dwarf stars, Reprints

IDENTIFIERS: (U) Pulsating stars, Kohoutek 1-18 nebula, PEB1102F, WUAFOSR2311A1

AD-A141 617 12/1 20/8

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR

(U) Autocorrelation Unfolding,

81 8P

PERSONAL AUTHORS: Fienup, J. R. ;

REPORT NO. ERIM-145400-13-J

CONTRACT NO. F49820-82-K-0018

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0410

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SPIE, v373 p203-210 1981.

Reprint: Autocorrelation Unfolding.

DESCRIPTORS: (U) *Autocorrelation, *Image restoration, Phase, Fourier transformation, Convex bodies, Functions, Problem solving, Points(Mathematics), Set theory, Vector spaces, Reprints

IDENTIFIERS: (U) *Phase retrieval, Image reconstruction

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 616 7/4 20/5

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Spatially Resolved Concentration Studies of Ground State Atoms and Ions in an ICP. Saturated Absorption Spectroscopic Method.

84 9P

PERSONAL AUTHORS: Walters, P. E.; Long, G. L.; Winefordner, J. D.;

CONTRACT NO. F48820 80-C-0005

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-84-0438

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Spectrochimica Acta, v38B n1 p69-78 1984.

Reprint: Spatially Resolved Concentration Studies of Ground State Atoms in a Flame: Saturated Absorption Spectroscopic Method.

DESCRIPTORS: (U) *Atomic spectra, *Absorption spectra, *Ground state, *Spatial distribution, *Flames, Strontium, Ethylene, Dye lasers, Pulsed lasers, Plasma diagnostics, Excitation, Reprints

IDENTIFIERS: (U) *Saturated absorption spectroscopy. Spatial resolution, PE81102F, WUAFOSR2303A1

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AD-A141 615 7/4

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

(U) Second Order Rate Constraints for Intramolecular Conversions: Application to Gas-Phase NMR Relaxation Times.

SEP 83 7P

PERSONAL AUTHORS: Bauer, S. H.; Lazaar, K. I.;

CONTRACT NO. AFOSR-80-0048, NSF-CHE79-04825

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-84-0413

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemistry Physical, v79 n6 p2808-2813, 15 Sep 83.

Reprint: Second Order Rate Constraints for Intramolecular Conversions: Application to Gas-Phase NMR Relaxation Times.

DESCRIPTORS: (U) *Reaction kinetics, *Rates, *Constants, *Isomerization, *Nuclear magnetic resonance, Low pressure, Gases, Relaxation time, Reprints

IDENTIFIERS: (U) Unimolecular reactions, Second order rate constants, Intramolecular conversions, PE81102F, WUAFOSR2303B1

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 614 7/4

AD-A141 805 20/2

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

HUGHES RESEARCH LABS MALIBU CA

(U) Intramolecular Unsymmetrical OHO Bonds.
Thermochemistry.

83

7P

PERSONAL AUTHORS: Lazaar, K. I. ; Bauer, S. H. ;

PERSONAL AUTHORS: Margerum, J. D. ; Wong, S. M. ; Jensen, J. E.
; Van Ast, C. I. ;

CONTRACT NO. AFOSR-80-0046, NSF-CHE79-04825

CONTRACT NO. F49620-77-C-0017

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0412

TR-84-0418

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry,
v87 n13 p2411-2418 1983.SUPPLEMENTARY NOTE: Pub. in Molecular Crystals and Liquid
Crystals, v4 p111-136 1984. See also AD-A115 120.Reprint: Intramolecular Unsymmetrical OHO Bonds.
Thermochemistry.Reprint: Effects of Molecular Length on Nematic Mixtures.
IV. Structure Effects on Viscosity of Ester Mixtures.DESCRIPTORS: (U) *Chemical bonds, *Thermochemistry,
Molecule molecule interactions, Symmetry, Oxygen,
Hydrogen, Acetones, Nuclear magnetic resonance, Chemical
properties, Shifting, Carbonyl compounds, Carbon, Isomers,
Solutions (Mixtures), Coupling (Interaction), Molecular
structure, Equilibrium (General), ReprintsDESCRIPTORS: (U) *Liquid crystals, *Molecular properties,
*Length, *Viscosity, *Molecular structure, Esters,
Polarity, Mixtures, ReprintsIDENTIFIERS: (U) *Nematic mixtures, Cybotactic nematic
characteristics, Molecular length, WUAFOSR2303A1,
PE81102F

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

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AD-A141 805

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 804 12/1

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR
(U) Reconstruction and Synthesis Applications of an
Iterative Algorithm.

81 15P

PERSONAL AUTHORS: Fienup, J. R. ;

REPORT NO. ERIM-145400-12-J

CONTRACT NO. F49620-82-K-0018

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0409

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Transformations in Optical
Processing, SPIE, v373 p147-180 1981.

Reprint: Reconstruction and Synthesis Applications of an
Iterative Algorithm.

DESCRIPTORS: (U) *Algorithms, *Iterations, Problem
solving, Convergence, Fourier transformation, Optics,
Reprints

IDENTIFIERS: (U) Gerchberg Saxton algorithm,
WUAFOSR2311A1, PE81102F

AD-A141 598 3/2

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND
ASTRONOMY

(U) A Possible New RR Lyrae Variable Star.

JAN 84 8P

PERSONAL AUTHORS: Grauer, A. D. ;

REPORT NO. CONTRIB-188

CONTRACT NO. AFOSR-82-0192

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-84-0407

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Astronomical Society of the
Pacific, v98 n575 p84-87 Jan 84.

Reprint: A Possible New RR Lyrae Variable Star.

DESCRIPTORS: (U) *Variable stars, Photometry, Reprints

IDENTIFIERS: (U) RR Lyrae stars, WUAFOSR2311A1, PE81102F

AD-A141 804

AD-A141 598

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 592

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AD-A141 585

3/2

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Mechanistic Studies of the Photodecomposition of Arylmethyl Sulfones in Homogeneous and Micellar Solutions.

84 8P

PERSONAL AUTHORS: Gould, I. R.; Tung, C. H.; Turro, N. J.; Givens, R. S.; Matuszewski, B.;

CONTRACT NO. AFOSR-81-0013

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR TR-84-0428

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v108 n6 p1789-1793 1984.

Reprint: Mechanistic Studies of the Photodecomposition of Arylmethyl Sulfones in Homogeneous and Micellar Solutions.

DESCRIPTORS: (U) *Reaction kinetics, *Photodecomposition, *Methyl radicals, *Aryl radicals, *Sulfones, Steady state, Solutions(Mixtures), Reprints

IDENTIFIERS: (U) *Arylmethyl sulfones, Triplet states, Micellar solutions, WJAFOSR2303BL, PEB1102F

AD-A141 592

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LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

(U) Light Variations of the Population II F-Type Supergiant HD 48703,

FEB 84 8P

PERSONAL AUTHORS: Bond, H. E.; Carney, B. W.; Grauer, A. D.;

CONTRACT NO. AFOSR-82-0192

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR TR-84-0408

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Publications of the Astronomical Society of the Pacific, v98 n576 p178-178 Feb 84.

Reprint: Light Variations of the Population II F-Type Supergiant HD 48703.

DESCRIPTORS: (U) *Supernovae, Variable stars, Reprints

IDENTIFIERS: (U) Pulsation, Supergiant HD 48703, WJAFOSR2311A1, PEB1102F

AD-A141 585

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A141 577 20/12

AD-A141 562 21/5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB

FLIGHT DYNAMICS RESEARCH CORP VAN NUYS CALIF

(U) High Resolution Measurements of Impurity-Induced Localized Vibrational Modes in Semiconductors.

(U) High Speed Ejectors.

DESCRIPTIVE NOTE: Final scientific rept. 1 Mar 83-29 Feb 84.

DESCRIPTIVE NOTE: Annual rept. 22 Mar 82-31 Mar 84.

MAR 84 39P

APR 84 29P

PERSONAL AUTHORS: Spitzer, W. G. ;

PERSONAL AUTHORS: Alperin, M. ;

CONTRACT NO. F33815-81-C-1408, AFOSR-83-0092

CONTRACT NO. F49820-81-C-0043

PROJECT NO. 2308

PROJECT NO. 2307

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0448

TR-84-0430

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The recent measurements and study of the carbon-induced localized vibrational mode (LVM) in GaAs have demonstrated that nearest neighbor isotropic frequency shifts can be observed if one uses the high resolution capability of a Fourier transform infrared (FTIR) spectrometer. One major importance of such measurements lies in the use of the shifts to determine the impurity site and the formation of complexes such as dimers. This feature has been used in a detailed study of the LVM infrared absorption of Si-doped GaAs. Samples electrically compensated by electron irradiation and by Li saturation were used in the study. Bands due to SiGa, SiAs, SiGa-SiAs, 7LiGa, and SiAs-AsGa (or VGa) were studied in high resolution. In several cases the structures observed in the high resolution measurements were compared with model calculations with generally satisfactory results.

DESCRIPTORS: (U) *Semiconductors, *Vibration, *Impurities, Carbon, Frequency shift, Fourier spectrometers, Dimers, Gallium arsenides, High resolution, Electron irradiation, Lattice dynamics

IDENTIFIERS: (U) PE81102F, WJAFOSR230681

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ABSTRACT: (U) A description of the test apparatus and some major experimental results are presented. The test apparatus is a pressurized test cell for simulation of translational motion by pressurization of the inlet flow to the corresponding stagnation pressure. The experiment consisted of measurement of the pressure distribution along the ejector surfaces and of the pressure, temperature and forces required to evaluate the mass flow, total forces and the ram drag. In addition, Schlieren photographs were taken at each test to observe the flow and in particular to illustrate the shock wave patterns. Combination of the pressure distribution and Schlieren photographs illustrate the successful achievement of second solution flows. Further tests are to be performed to illustrate the optimization of second solution performance and for comparison between theory and experiment. (Author)

DESCRIPTORS: (U) *Thrust augmentation, *Ejectors, *Thrusters, Jet mixing flow, Diffusers, Gas generator engines, Simulation, Pressure distribution, Stagnation pressure, Ramjet inlets, Test equipment, Turbofan engines

IDENTIFIERS: (U) High speed ejectors, PE81102F, WJAFOSR2307A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 541 12/1 9/2

AD A141 519 12/1

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

COLUMBIA UNIV NEW YORK DEPT OF MATHEMATICS

(U) On the Equivalence of Logical Databases.

(U) Nonlinear Partial Differential Equations and Related Problems of Pade Approximations

DESCRIPTIVE NOTE: Technical rept.

DESCRIPTIVE NOTE: Progress rept. 30 Jun 82-29 Jun 83.

84 9P

DEC 83 15P

PERSONAL AUTHORS: Kuper, G. M.; Ullman, J. D.; Vardi, M. Y.;

PERSONAL AUTHORS: Chudnovsky, D. V.; Chudnovsky, G. V.;

CONTRACT NO AFOSR 80-0212

CONTRACT NO AFOSR-81-0190

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A2

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0360

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The investigators suggest a new approach to database updates, in which a database is treated as a collection of theories. They investigate two issues: 1) equivalence of databases under update operations, b) simultaneous multiple update operations. (Author)

ABSTRACT: (U) During the period of the grant the investigators continued their studies of one-four dimensional classical and quantum lattice and continuous completely integrable systems. Their technique is based on the method of Backlund transformations and their algebraic, geometric and arithmetic properties. Methods of Backlund transformations were successfully used in the study of Pade approximations. One of the significant achievements during the last year was the solution of the key problem on the almost perfectness of Pade approximations to solutions of linear differential equations. (Author)

DESCRIPTORS: (U) *Mathematical models, *Data bases, *Modification, Approach, Theory, Operation

IDENTIFIERS: (U) Equivalence, PE81102F, WUAFOSR2304A2

DESCRIPTORS: (U) *Nonlinear differential equations, *partial differential equations, *Approximation(Mathematics), Transformations(Mathematics), S matrix, Linear differential equations, Integrated systems

IDENTIFIERS: (U) *Pade approximations, WUAFOSR2304A4, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 499 5/10

AD-A141 499 CONTINUED

NEW MEXICO STATE UNIV LAS CRUCES BEHAVIORAL ENGINEERING
LAB

system, Vision, Stress(Psychology), Balance,
Indexes(Ratios)

(U) Eye Accommodation, Personality, and Autonomic Balance.

IDENTIFIERS: (U) *Accommodation, PEB1102F, WUAFOSR2313A4

DESCRIPTIVE NOTE: Technical rept.,

NOV 79 98P

PERSONAL AUTHORS: Gawron, V. J. ;

REPORT NO. BEL-79-2/AFOSR-79-8

CONTRACT NO. AFOSR-80-0024

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-84-0427

UNCLASSIFIED REPORT

ABSTRACT: (U) The automatic nervous system is made up of two subsystems: the parasympathetic (PNS) and the sympathetic (SNS). The balance between these systems regulates bodily functioning during routine (PNS-dominant) and crisis (SNS-dominant) situations. It also controls visual accommodation for near (PNS-dominant) and far (SNS-dominant) focus. The balance between these physiological systems has been linked to individual differences in personality characteristics, especially introversion (PNS-dominant) and extraversion (SNS-dominant). Since the balance mediates accommodation, the similar personality differences between near- and far-sighted individuals may be related to the more general parasympathetic-sympathetic balance rather than being related solely to the visual capability difference. The relationships among autonomic balance (as measured by a battery of four physiological tests modified from Wenger and Ellington, 1943, and by a technique introduced by Porges, 1976), refractive error (measured by dark focus, near and far points using a polarized vernier optometer), and introversion - extraversion (Eysenck Personality Inventory introversion - extraversion scale core) were investigated.

DESCRIPTORS: (U) *Eye, *Personality, *Autonomic nervous

AD-A141 499

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVL08F

AD-A141 488

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AD-A141 489 20/5 7/5

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) A Note on Lossless database Decompositions.

(U) Laser Photochemistry.

DESCRIPTIVE NOTE: Technical rept..

DEC 83 11P

84 81P

PERSONAL AUTHORS: Vardi, M. Y. ;

PERSONAL AUTHORS: George, T. F. ; Berl, A. C. ; Lam, K. S. ;
Lin, J. T. ;

CONTRACT NO. AFOSR-80-0212

CONTRACT NO. AFOSR-82-0046, NSF-CHE80-22874

PROJECT NO. 2304

PROJECT NO. 2303

TASK NO. A2

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR
TR-84-0341

TR-84-0358

UNCLASSIFIED REPORT

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ABSTRACT: (U) It is known that under a wide variety of assumptions a database decomposition is lossless if and only if the database scheme has a lossless join. Biskup, Dayal, and Bernstein have shown that when the given dependencies are functional then the database scheme has a lossless join if and only if one of the relation scheme is a key for the universal scheme. In this note the investigators supply an alternative proof of that characterization. The proof uses tools from the theory of embedded join dependencies and the theory of tuple and equality generating dependencies, but is, nevertheless, much simpler than the previously published proof. (Author)

DESCRIPTORS: (U) *Data bases, *Decomposition, Embedding, Theorems

IDENTIFIERS: (U) Losslessness, Relational databases, PE81102F, WUAFOSR2304A2

SUPPLEMENTARY NOTE: Pub. in Laser Applications, v5 p69-127 1984.

Reprint: Laser Photochemistry.

DESCRIPTORS: (U) *Lasers, *Photochemical reactions, Photodissociation, Vapor deposition, Microelectronics, Integrated circuits, Catalysis, Quantum chemistry, Photons, Molecular properties, Reprints

IDENTIFIERS: (U) WUAFOSR2303A2, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL06F

AD-A141 454 9/5 12/1

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Recursive Input-Output and State-Space Solutions for Continuous-Time Linear Estimation Problems.

SEP 83 11P

PERSONAL AUTHORS: Kallath, T. ; Ljung, L. ; Morf, M. ;

CONTRACT NO. DAAG29-83-K-0028, F49620-79-C-0058

MONITOR: ARO AFOSR
19876.18-MA, TR-84-0496

UNCLASSIFIED REPORT

Availability: Pub. in IEEE Transactions on Automatic Control, vol 28 no p897-906 Sep 83 (No copies furnished by DTIC/NTIS).

SUPPLEMENTARY NOTE: Presented at the IEEE Congress on Decision and Control, Clearwater, FL., Dec 78.

Reprint: Recursive Input-Output and State-Space Solutions for Continuous-Time Linear Estimation Problems.

DESCRIPTORS: (U) *Recursive filters, *Computations, Linear algebra, Estimates, Covariance, Input output processing, Reprints

IDENTIFIERS: (U) OP

AD-A141 449 7/4

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) The Disilenes. Chemistry of Silicon-Silicon Double Bonds.

84 12P

PERSONAL AUTHORS: West, R. ;

CONTRACT NO. AFOSR-82-0067

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0314

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Pure and Applied Chemistry, v56 n1 p163-173 1984.

Reprint: The Disilenes: Chemistry of Silicon-Silicon Double Bonds.

DESCRIPTORS: (U) *Silicon compounds, *Covalent bonds, Isomers, Crystal structure, X ray spectroscopy, Nuclear magnetic resonance, Photolysis, Reprints

IDENTIFIERS: (U) Disilenes, Sillylenes

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVLOS6

AD-A141 439 12/1

STANFORD UNIV CA

(U) Efficient Inversion of Toeplitz-Block Toeplitz Matrix.

OCT 83 5P

PERSONAL AUTHORS: Wax, M. ;Kailath, T. ;

CONTRACT NO. DAAG29-83-K-0028, F49620-79-C-0058

MONITOR: ARO, AFOSR
19876.13-MA, TR-84-0497

UNCLASSIFIED REPORT

Availability: Pub. in IEEE transactions on Acoustics, Speech, and Signal Processing, VASSP-31 n5 p1218-1221 Oct 83 (No copies furnished by DTIC/NTIS).

Reprint: Efficient Inversion of Toeplitz-Block Toeplitz Matrix.

DESCRIPTORS: (U) *Matrices(Mathematics), Algorithms, Inversion, Reprints

IDENTIFIERS: (U) Toeplitz matrix

AD-A141 433 17/2

STANFORD UNIV CA

(U) Optimum Localization of Multiple Sources by Passive Arrays.

OCT 83 10P

PERSONAL AUTHORS: Wax, M. ;Kailath, T. ;

CONTRACT NO. DAAG29-83-K-0028, AFOSR-83-0228

MONITOR: ARO, AFOSR
19876.5-MA, TR-84-0489

UNCLASSIFIED REPORT

Availability: Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, VASSP-31 n5 p1210-1218 Oct 83 (No copies furnished by DTIC/NTIS).

Reprint: Optimum Localization of Multiple Sources by Passive Arrays.

DESCRIPTORS: (U) *Phased arrays, Passive systems, Signal processing, Covariance, Reprints

AD-A141 439

UNCLASSIFIED

AD-A141 433

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVL08F

AD-A141 428 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Formation and Rearrangement of Sulfur-Insertion
Products of Octaethylcyclotetrasilane.

83 8P

PERSONAL AUTHORS: Carlson, C. W. ; West, R. ;

CONTRACT NO. AFOSR-82-0087

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-84-0315

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v2 p1798-
18011983.

Reprint: Formation and Rearrangement of Sulfur-Insertion
Products of Octaethylcyclotetrasilane.

DESCRIPTORS: (U) *Silanes, *Cyclic compounds, *Sulfur,
*Chemical reactions, Reaction kinetics, Rings,
Elimination reactions, Isomers, Atomic structure,
Reprints

IDENTIFIERS: (U) Silanethione, PE81102F, WUAFOSR230382

AD-A141 418 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND
STATISTICS

(U) On the Almost Sure Convergence of Randomly Weighted
Sums of Random Elements.

83 4P

PERSONAL AUTHORS: Taylor, R. L. ; Calhoun, C. A. ;

CONTRACT NO. AFOSR-81-0188

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-84-0292

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in the Annals of Probability,
v11 n3 p795-797 1983. See also AD-A088 330.

Reprint: On the Almost Sure Convergence of Randomly
Weighted Sums of Random Elements.

DESCRIPTORS: (U) *Banach space, *Sequences(Mathematics),
Random variables, Convergence, Topology, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A5

AD-A141 428

AD-A141 418

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