SECOND HOWARD UNIVERSITY SYMPOSIUM ON NONLINEAR SEMIGROUPS, PARTIAL DIFFERENTIAL EQUATIONS AND ATTRACTORS

SYMPOSIUM REPORT

BY

DR. TEPPER L. GILL
AND
DR. W.W. ZACHARY

DISTRIBUTION STATEMENT A
Approved for public release: Distribution Unlimited
There were 76 participants composed of 13 graduate students; 12 recent Ph.D.'s; 5 international visitors; 15 engineers and 36 research mathematicians representing over thirty major American universities in addition to a few major government and private research laboratories. The symposium was quite successful.
SECOND HOWARD UNIVERSITY SYMPOSIUM ON NONLINEAR SEMIGROUPS, PARTIAL DIFFERENTIAL EQUATIONS AND ATTRACTORS

The second Howard University Symposium on Nonlinear Semigroups, Partial Differential Equations and Attractors convened in Washington, D.C. August 3-7, 1987 on the campus of Howard University. The symposium organizers were Tepper L. Gill (Howard University) and Woodford W. Zachary (Naval Research Laboratory). They were ably supported by James A. Donaldson (Howard), L. Evans (University of Maryland), James Sandefur and Andrew Vogt (Georgetown University) and Michael Reed (Duke University).

The symposium was made possible by grant support from: Air Force Office of Scientific Research, Army Research Office, Department of Energy, NASA, National Science Foundation, and the Office of Naval Research.

The symposium opened with breakfast in the faculty dining room of the Blackburn Center. Mr. M. Lucius Walker, Jr., Dean of the School of Engineering, gave the opening address. Dr. Walker commented on the urgent need for continued and deeper collaboration between mathematicians and engineers in facing some of the difficult problems attendant to space exploration.

There were 76 participants composed of 13 graduate students; 12 recent Ph.D.'s; 5 international visitors (Canada, France, Japan, Nigeria, and Spain); 15 engineers and 36 research mathematicians representing over thirty major American universities in addition to a few major government and private research laboratories. The symposium program of speakers along with other information may be found in the appendix to this report.

The proceedings of the conference are currently being prepared for publication by Springer.
SECOND HOWARD UNIVERSITY SYMPOSIUM ON NONLINEAR SEMIGROUPS,
PARTIAL DIFFERENTIAL EQUATIONS AND ATTRACTORS
HOWARD UNIVERSITY
WASHINGTON, D.C.
3-7 August 1987

TOPICS
This conference will focus on nonlinear partial and integrodifferential equations by considering them as infinite-dimensional dynamical systems. One day will be devoted to new classes of equations that arise via mathematical modelling of large flexible space structures. Some of the topics which will be represented are:

- Nonlinear Semigroups
- Dynamical Systems
- Attractors
- Reduction to Finite-Dimensional Systems
- Inertial Manifolds
- Bifurcation Theory
- Control Theory
- Compensated Compactness
- Nonlinear Evolution Equations
- Reaction-Diffusion Equations
- Stability Analysis of PDE's

FORMAT
There will be papers reviewing important developments since the last conference and presenting key recent results.

INVITED TALKS

M. Berger, University of Massachusetts
N. Bhatia, University of Maryland
S.N. Chow, Michigan State University
M. Crandall, University of Wisconsin
H. Engler, Georgetown University
L.C. Evans, University of Maryland
J.A. Goldstein, Tulane University
J. Mallet-Paret, Brown University
R.H. Martin, Jr., North Carolina State University
B. Nicolaenko, Los Alamos National Laboratory

M.C. Reed, Duke University
J. Sandefur, Georgetown University
E. Schechter, Vanderbilt University
T. Siedman, University of Maryland
G.R. Sell, University of Minnesota
A. Vogt, Georgetown University
W.E. Fitzgibbon, University of Houston
S. Reich, U.S.C.
L. Vazquez, University of Madrid
W. Strauss, Brown University
R. Steinberg, ONR Boston

IMPORTANT DATES
Deadline for submission of Abstracts: June 15, 1987
Preconference Registration: June 1, 1987

FOR FURTHER INFORMATION CONTACT
Tepper L. Gill
Department of Electrical Engineering
Howard University
Washington, DC 20059
202-636-6585

W.W. Zachary
Naval Research Laboratory
Washington, DC 20375
202-767-2572

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SECOND HOWARD UNIVERSITY SYMPOSIUM ON
NONLINEAR SEMIGROUPS, PARTIAL DIFFERENTIAL EQUATIONS
AND ATTRACTORS

August 3-7, 1987

PROGRAM

Monday, August 3

7:30-8:30 a.m. Registration and Breakfast
Faculty Dining Room
Blackburn Center

8:30 - 8:45 a.m. Opening Address
Dr. M. Lucius Walker, Jr.
Dean, School of Engineering

SESSION A: Auditorium, Chemistry Building

NONLINEAR EVOLUTION EQUATIONS
Chairman: Walter Strauss, Brown University

9:00 - 9:45 a.m. George R. Sell, University of Minnesota
"Melnikov Transformations, Bernouilli Bundles
and Almost Periodic Perturbations"

9:45-10:30 a.m. Michael Weinstein, Princeton University
"Remarks on Stability, Instability, and Resonances"

10:30 - 11:00 a.m. Coffee Break

11:00 - 11:45 a.m. Robert Carroll, University of Illinois
"Some Features of Maps from Potentials to Spectral
Data"

11:45 - 12:30 p.m. J. E. Lin, George Mason University
"On the Integrability of Nonlinear Evolution Equations"

12:30 - 2:00 p.m. Lunch
Tuesday, August 4

SESSION D: Auditorium, Chemistry Building

**ATTRACTORS and BIFURCATIONS**
Chairman: George Sell, University of Minnesota

9:15 - 10:00 a.m.  
Melvyn Berger, University of Massachusetts, Amherst  
"Vortex Motions in Mathematics and Fluids, Their Bifurcations and Instabilities"

10:00 - 10:45 a.m.  
Shui-Nee Chow, Michigan State University  
"Bifurcation of Homoclinic Orbits"

10:45 - 11:15 a.m.  
Coffee Break

11:15 - 12:00 noon  
Basil Nicolaenko, Los Alamos National Laboratory  
"A New Construction of Integral Inertial Manifolds: Applications to Two-Dimensional Turbulent Flows with Computer Movies"

12:00 - 12:45 p.m.  
Nam P. Bhatia, University of Maryland, Baltimore County  
"Separated Loops and an Extension of Sarkovskii's Theorem"

SESSION E: Lecture Hall G-9, Chemistry Building

**GENERAL INTEREST**
Chairman: Luis Vazquez, Universidad Complutense, Madrid

8:30 - 9:15 a.m.  
Robert Sternberg, ONR, Boston  
"Symmetry in Geometrical Optics"

9:15 - 10:00 a.m.  
Stuart Antman, University of Maryland  
"Asymptotics of Quasilinear Equations of Viscoelasticity"

10:00 - 10:45 a.m.  
Jerome A. Goldstein, Tulane University  
"Spin Polarized Thomas-Fermi Theory"

10:45 - 11:15 a.m.  
Coffee Break

11:15 - 12:00 noon  
Thomas Seidman, University of Maryland Baltimore County  
"Switching Systems and Periodicity"

12:00 - 12:45 p.m.  
Andrew Vogt, Georgetown University  
"The Riccati Equation Revisited"

12:45 - 2:00 p.m.  
Lunch
Wednesday, August 5

SESSION H: Auditorium, Chemistry Building

SPECIAL DAY ON LARGE SPACE STRUCTURES
Chairman: Taft H. Broome, Jr., Howard University

8:30 - 9:15 a.m. Norris Stubbs, Texas A & M University
"Nonlinear Problems in Damage Mechanics of Large Space Structures"

9:15 - 10:00 a.m. Jack Lagnese, Georgetown University
"Infinite Horizon Linear-quadratic Problems for Plates"

10:00 - 10:45 a.m. Michael Polis, Wayne State University
"On Issues Related to Stabilization of Hyperbolic Distributed Parameter Systems"

10:45 - 11:15 a.m. Coffee Break

11:15 - 12:00 noon Robert Reiss, Howard University
"Optimization Criteria for Large Space Structures Modeled as Continuous Media"

12:00 - 12:45 p.m. Anthony K. Amos, AFOSR
"Nonlinear P.D.E. Issues for Space Structure Problems of Interest to AFOSR"

Thursday, August 6

SESSION J: Auditorium, Chemistry Building

NONLINEAR SEMIGROUPS
Chairman: L.C. Evans, University of Maryland

9:15 - 10:00 a.m. Robert Martin, Jr., North Carolina State University
"Strict Inequalities for Semilinear Systems of Differential Equations"

10:00 - 10:45 a.m. John Mallet-Paret, Brown University
"Poincare-Bendixon Theory for Reaction Diffusion Equations"

10:45 - 11:15 a.m. Coffee Break

11:15 - 12:00 noon P. Souganidis, Brown University
"A Geometrical Optics Approach to Certain Reaction Diffusion Equations"

12:00 - 2:00 p.m. Lunch
Friday, August 7

SESSION M: Auditorium, Chemistry Building

NONLINEAR EVOLUTION EQUATIONS
Chairman, Andrew Vogt, Georgetown University

9:15 - 10:00 a.m. David W. McLaughlin, University of Arizona
"Coherence and Chaos in Non-Integrable PDE's"

10:00 - 10:45 a.m. T.H. Cazenave, Universite de Paris VI
"Some Remarks on Nonlinear Schrodinger Equations"

10:45 - 11:15 a.m. Coffee Break

11:15 - 12:00 noon Luis Vazquez, Universidad Complutense, Madrid
"The Finite Difference Method in the Quantum Theory"

12:00 - 12:45 p.m. Walter Miller, Howard University
"Dynamics of Periodically Forced Traveling Waves of the KdV Equation and Chaos"

12:45 - 2:00 p.m. Lunch

SESSION N: Auditorium, Chemistry Building

EXISTENCE, ETC.
Chairman: James Sandefur, Georgetown University

2:00 - 2:45 p.m. Thomas Seidman, University of Maryland, Baltimore County.
"A Parabolic System Arising in Semiconductor Theory"

2:45 - 3:30 p.m. Joel Avrin, University of North Carolina at Charlotte
"The Semilinear Parabolic Equations of Electrophoretic Separation"

3:30 - 4:45 p.m. Mary E. Parrott, University of South Florida
"The Weak Solution of a Functional Differential Equation in a General Banach Space"

4:45 - 5:30 p.m. Eric Schechter, Vanderbilt University
"Some Local-in-time Results for Nonlinear Evolutions"
THE SECOND HOWARD UNIVERSITY
SYMPOSIUM ON NONLINEAR SEMIGROUPS
PARTIAL DIFFERENTIAL EQUATIONS, AND ATTRACTORS
PARTICIPANT'S LIST

1. Charles D. Adams
   Mathematics Department
   Howard University
   Washington, D.C. 20059

2. M.E. Aluko
   Chemical Engg Dept
   Howard University
   Washington, D.C.

3. Anthony Amos
   Air Force Office of Scientific Research
   Washington, D.C.

4. Stuart Antman
   Mathematics Department
   University of Maryland
   College Park, MD 20742

5. Joe Auslander
   Mathematics Department
   University of Maryland
   College Park, MD 20742

6. Joel Avrin
   Mathematics Department
   Univ of NC - Charlotte
   Charlotte, NC

7. Stavros Belbas
   Mathematics Department
   University of Alabama
   Tuscaloosa, AL 35487

8. Melvyn Berger
   Mathematics Department
   Univ of Massachusetts
   Amherst, MA

9. Nam P. Bhatia
   Mathematics Department
   Univ of MD - BaltoCounty
   5401 Wilkins Ave
   Catonsville, MD 21228

10. Taft Broome
    Civil Engineering Dept
    Howard University
    Washington, D.C. 20059

11. John Cannon
    Dir of Math Science
    Office of Naval Research
    Arlington, VA 22217

12. Robert Carroll
    Mathematics Department
    University of Illinois
    Urbana, IL 61801

13. T.H. Cazenave
    University of Paris VI
    Paris, France

    Electrical Engg Dept
    Howard University
    Washington, D.C. 20059
15. Shi-Nee Chow  
Mathematics Department  
Michigan State University  
East Lansing, Michigan

16. Michael Crandall  
Mathematics Department  
University of Wisconsin  
Madison, Wisconsin

17. James A. Donaldson  
Mathematics Department  
Howard University  
Washington, D.C. 20059

18. John Donelson, III  
Science Appl Int'l Corp  
803 W. Broad Street  
Falls Church, VA  22046

19. Avron Douglis  
Mathematics Department  
University of Maryland  
College Park, MD 20742

20. John Dye  
Mathematics Department  
Univ of Southern California  
Los Angeles, CA

21. Mehdi Eliassi  
Univ of New Mexico  
P.O. Box 4784  
Albuquerque, NM  87196

22. Colette Eluhu  
Mathematics Department  
Howard University  
Washington, D.C. 20059

23. Hans Engler  
Mathematics Department  
Georgetown University  
Washington, D.C. 20057

24. Bernard Epstein  
Math Science Dept  
George Mason University  
Fairfax, VA  22030

25. Lawrence C. Evans  
Mathematics Department  
University of Maryland  
College Park, MD 20742

26. W.E. Fitzgibbon  
Mathematics Department  
University of Houston  
Houston, TX

27. Tepper L. Gill  
Electrical Engineering Dept  
Howard University  
Washington, D.C. 20059

28. Jerome A. Goldstein  
Mathematics Department  
Tulane University  
New Orleans, LA  70118

29. James M. Greenberg  
Mathematics Department  
Univ of MD - Balto County  
Columbia, MD  21044

30. Carlos Handy  
Physics Department  
Atlanta University  
Atlanta, Georgia
31. Isom Herron  
Mathematics Department  
Howard University  
Washington, D.C. 20059

39. J.E. Lin  
Mathematics Department  
George Mason University  
4400 University Drive  
Fairfax, VA 22030

32. Alain Haraux  
Universite de Paris VI  
Paris, France

40. John Mallet-Paret  
Mathematics Department  
Brown University  
Providence, RI 02912

33. Fern Hunt  
Mathematics Department  
Howard University  
Washington, D.C. 20059

41. Robert Martin, Jr.  
Mathematics Department  
NC State University  
Raleigh, NC 27607

34. Femi Idow  
Mathematics Department  
Howard University  
Washington, D.C. 20059

42. David McLaughlin  
Mathematics Department  
University of Arizona  
Tucson, AZ 85721

35. Toshiyuki Iwamiya  
Mathematics Department  
University of Maryland  
College Park, MD 20742

43. Margaret Memory  
Mathematics Department  
University of Alabama  
Tuscaloosa, AL 35401

36. Chris Jones  
Mathematics Department  
University of Maryland  
College Park, MD 20742

44. Ronald E. Mickens  
Physics Department  
Atlanta University  
Atlanta, GA 30314

37. Jack Lagnese  
Mathematics Department  
Georgetown University  
Washington, D.C. 20057

45. Walter Miller  
Mathematics Department  
Howard University  
Washington, D.C. 20059

38. Chin-Yuan Lin  
Mathematics Department  
Tulane University  
New Orleans, LA 70118

46. Jeffrey Morgan  
Mathematics Department  
Texas A & M University  
College Station, TX 77843
47. Mary E. Parrott  
Mathematics Department  
University of Southern Florida  
Tampa, Florida 33620

48. Esteban Poffold  
Mathematics Department  
Wabash College  
Crawfordsville, IN 47933

49. Michael Polis  
Mathematics Department  
Wayne State University  
Detroit, MI 48202

50. Carl Prather  
Mathematics Department  
Virginia Tech  
Blacksburg, VA 24061-4097

51. Louise Raphael  
Mathematics Department  
Howard University  
Washington, D.C. 20059

52. Michael C. Reed  
Mathematics Department  
Duke University  
Durham, NC 27706

53. Simeon Reich  
Mathematics Department  
Univ of Southern California  
Los Angeles, CA 90007

54. Robert Reiss  
Mechanical Engineering  
Howard University  
Washington, D.C. 20059

55. Michael Renardy  
Mathematics Department  
Virginia Tech  
Blacksburg, VA 24061

56. Gisele Ruiz Reider  
Mathematics Department  
Louisiana State University  
Baton Rouge, LA 70803

57. Joel C.W. Rogers  
Polytechnic Univ-Brooklyn  
333 Jay Street  
Brooklyn, NY 11201

58. James Sandefur  
Mathematics Department  
Georgetown University  
Washington, D.C. 20057

59. Eric Schechter  
Mathematics Department  
Vanderbilt University  
Box 21, Station B  
Nashville, TN 37235

60. Thomas Seidman  
Mathematics Department  
Univ of MD - Balto County  
Catonsville, MD 21228

61. George Sell  
Mathematics Department  
University of Minnesota  
Minneapolis, MN

62. Mohamed Sesay  
Mathematics Department  
Univ of District of Columbia  
4200 Conn. Ave., N.W.  
Washington, D.C. 20008
63. Michael W. Smiley  
Mathematics Department  
Iowa State University  
Ames, Iowa  50010

64. P. Souganidis  
Division of Applied Math  
Brown University  
Providence, RI  02912

65. Robert L. Sternberg  
Office of Naval Research  
495 Summer Street  
Boston, MA  02210

66. Walter Strauss  
Mathematics Department  
Brown University  
Providence, RI  02912

67. Norris Stubbs  
Civil Engineering Department  
Texas A&M University  
College Station, TX  77843

68. J. Turi  
Department of Math Sciences  
Worcester Polytechnic Inst  
Worcester, MA  01609

69. Luis Vazquez  
Dept Fisica Teorica  
Univ Complutense  
Madrid, Spain

70. Andrew Vogt  
Mathematics Department  
Georgetown University  
Washington, D.C.  20057

71. M. Lucius Walker, Jr.  
Engineering School Dean  
Howard University  
Washington, D.C.  20059

72. Michael Weinstein  
Mathematics Department  
Princeton University  
Princeton, NJ  08544

73. Daniel Williams  
Mathematics Department  
Howard University  
Washington, D.C.  20059

74. James Yorke  
Mathematics Department  
University of Maryland  
College Park, MD  20742

75. Woodford Zachary  
Naval Research Lab  
Washington, D.C.  20375

76. S. Zaidman  
Mathematics Department  
University of Montreal  
5620 Darlington Avenue  
Montreal, Canada
END
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