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13. ABSTRACT (Maximum 200 words)

Research supported in the period of the grant produced significant results of use in the areas of reliability assessment, design of systems for dependabilities, Martion Cham analysis, goodness-of-fit tests, and censored and truncated data analysis. The PI effectively disseminated his results through invited talks at significant national meetings and through published journals.

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FINAL REPORT

Statistical Inference for Coherent Systems from Partial Information and in Resampling Techniques in Survival Analysis

AFOSR Grant No. 90-0202

Hani Doss, Principal Investigator

Period September 1, 1990 to September 30, 1993

Technical Reports Issued

AFOSR #1   Doss, H. and Chiang, Y. C. (1991). Choosing the Resampling Scheme when Bootstrapping: A Case Study in Reliability.

AFOSR #2   Doss, H. (1991). Bayesian Nonparametric Estimation for Incomplete Data Via Successive Substitution Sampling.

AFOSR #3   Doss, H., and Gill, R. D. (1991). An Elementary Approach to Weak Convergence for Quantile Processes, with Applications to Censored Survival Data.

AFOSR #4   Antoine, R., Doss, H., and Hollander, M. (1991). A Comparison of Various Estimators in Reliability Models Involving Mutual Censorship of Component Lifelengths.

AFOSR #5   Antoine, R., Doss, H., and Hollander, M (1991). On Identifiability in the Autopsy Model of Reliability Theory.

AFOSR #6   Burr, D. and Doss, H. (1992). Confidence Bands for the Median Survival Time as a Function of the Covariates in the Cox Model.

AFOSR #7   Athreya, K. B., Doss, H. and Sethuraman, J. (1992). A Proof of Convergence of the Markov Chain Simulation Method.

AFOSR #8   Doss, H. (1992). Using the Output of Successive Substitution Sampling Algorithms to Dynamically Change the Prior and Posterior in Bayesian Nonparametric Estimation for Incomplete Data.

AFOSR #9   Li, G. and Doss, H. (1992). Generalized Pearson-Fisher Chi-Square Goodness-of-Fit Tests, with Applications to Models with Life History Data.

AFOSR #10   Athreya, K. B., Doss, H. and Sethuraman, J. (1993). Easy-to-Apply Results for Establishing Convergence of Markov Chains in Bayesian Analysis.

Papers Accepted or Tentatively Accepted but not yet Published

1. Doss, H. (1991). Bayesian Nonparametric Estimation for Incomplete Data Via Successive Substitution Sampling. Tentatively accepted subject to minor revision by *The Annals of Statistics*.

2. Doss, H. and Chiang, Y. C. (1991). Choosing the Resampling Scheme when Bootstrapping: A Case Study in Reliability. To appear in *The Journal of the American Statistical Association*.

3. Antoine, R., Doss, H., and Hollander, M. (1993). On Identifiability in the Autopsy Model of Reliability Theory. To appear in *Journal of Applied Probability*.

4. Burr, D. and Doss, H. (1993). Confidence Bands for the Median Survival Time as a Function of the Covariates in the Cox Model. To appear in *The Journal of the American Statistical Association*.

5. Doss, H. (1994). Using the Output of Successive Substitution Sampling Algorithms to Dynamically Change the Prior and Posterior in Bayesian Nonparametric Estimation for Incomplete Data. To appear in the *Proceedings of the Fifth Purdue Symposium on Statistical Decision Theory and Related Topics*.

Papers Published

1. Doss, H., and Gill, R. D. (1992). An Elementary Approach to Weak Convergence for Quantile Processes, with Applications to Censored Survival Data. *The Journal of the American Statistical Association 87*, 869–877.

2. Antoine, R., Doss, H., and Hollander, M. (1991). A Comparison of Various Estimators in Reliability Models Involving Mutual Censorship of Component Lifelengths. *Proceedings of the Fourth International Research Conference on Reliability*, 1–19, 1993.

3. Li, G. and Doss, H. (1992). Generalized Pearson-Fisher Chi-Square Goodness-of-Fit Tests, with Applications to Models with Life History Data. *The Annals of Statistics* 772–797, 1993.

4. Athreya, K. B., Doss, H. and Sethuraman, J. (1993). Easy-to-Apply Results for Establishing Convergence of Markov Chains in Bayesian Analysis. *Proceedings of the Thirty-Eighth Conference on the Design of Experiments* held by the Army Research Office, 263–270, 1993.

Doctoral Dissertations Completed

1. Ji-Hyun Kim, "Bootstrap Methods for Censored Data"; defended, 1990.

2. Robin Antoine, "Identifiability in the Autopsy Model of Reliability Theory"; defended 1991 (joint direction with M. Hollander).

3. Gang Li, "Generalized Pearson-Fisher Chi-Square Goodness-of-Fit Tests, with Applications to Models with Life History Data"; defended, 1992.

Other Activities

1. I gave an invited talk at the Department of Statistics at Texas A&M University, in September, 1990.

2. I gave an invited talk at the Fourth International Research Conference on Reliability, at the University of Missouri-Columbia, in June 1991.

3. I attended the Joint Annual Meetings of the American Statistical Association in Atlanta, Georgia, in August, 1991.

4. I attended the Workshop on Case Studies in the Applications of Bayesian Ideas and Analysis in Problems in Science and Technology, at Carnegie-Mellon University, September, 1991.

5. I was an Invited Discussant on Special Invited Paper "Statistical Uses of Successive Substitution" by M. Schervish, at the IMS Eastern Meeting in Cincinnati, Ohio, March 1992.

6. I gave an invited talk at the Fifth Purdue Symposium on Statistical Decision Theory and Related Topics, Purdue University, in June 1992.

7. I attended the Joint Annual Meetings of the American Statistical Association in Boston, Massachussetts, in August, 1992.

8. I gave an invited talk at the IMS Directions in Probability Workshop on Monte Carlo Markov Chains, Stanford, California, August, 1993.

9. I attended the Joint Annual Meetings of the American Statistical Association in San Francisco in August, 1993.

10. I was a member of the Joint Statistical Advisory Group at Stanford University (a group of researchers who study problems posed by the N.S.A.) led by Dr. J. Maar of the N.S.A. and Professor H. Solomon of the Statistics Department at Stanford, for each of the three summers in the period under consideration. I wrote four technical memoranda on problems of interest to some anonymous parties in the D.o.D. and forwarded to us through Dr. Maar.

11. I served as an associate editor for the *Journal of the American Statistical Association* during the period March 1992 to the end of the period under consideration.