

McMASTER UNIVERSITY
GRADUATE PROGRAM IN STATISTICS

STATISTICS SEMINAR

Speaker: Dr. N. Balakrishnan, Department of Mathematics and Statistics, McMaster University

Title: *“Optimal Sample Size Allocation in Extreme Value Regression for Multi-Stress Testing”*

Day: Tuesday September 28, 2004

Time: 3:30 - 4:30 PM

Place: HH/217 - Deloitte Colloquium Room (Refreshments in HH/216 at 3:00 PM)

SUMMARY

In this talk, I will discuss the optimal allocation problem on a multi-stress life-testing experiment. The extreme value regression model is commonly used for the statistical analysis of data arising from such a multi-stress experiment; see, for example, the books by Nelson (1982) and Meeker and Escobar (1998). By considering this situation, I will discuss the MLEs, expected Fisher information and different optimality criteria for the optimal allocation problem. I will then demonstrate the efficiency of this optimal allocation rule by using the real experimental situations considered earlier by McCool (1980) and Nelson and Meeker (1978). Finally, I will present some Monte Carlo simulation results to discuss the performance of these optimality results in the case of small sample sizes.

REFERENCES

1. McCool, J. I. (1980). "Confidence Limits for Weibull Regression with Censored Data", *IEEE Transactions on Reliability* **29**, pp. 145-150.
2. Meeker, W. Q. and Escobar, L. A. (1998). *Statistical Methods for Reliability Data*, John Wiley & Sons, New York.
3. Nelson, W. (1982). *Applied Life Data Analysis*, John Wiley & Sons, New York.
4. Nelson, W. and Meeker, W. Q. (1978). "Theory for Optimum Accelerated Censored Life Tests for Weibull and Extreme Value Distributions", *Technometrics* **20**, pp. 171-177.



ABOUT THE SPEAKER: Dr. N Balakrishnan is a Professor of Statistics in the Department of Mathematics and Statistics at McMaster University. He obtained his B.Sc. and M.Sc. degrees in statistics from University of Madras (India) and his Ph.D. in statistics from the Indian Institute of Technology (Kanpur, India). His research interests include order statistics, inferential methods, distribution theory, life-testing and reliability, multivariate analysis and robust inference. Dr. Balakrishnan is the author and co-author of many books and research papers in statistics. He has been editor or associate editor of many statistical journals, including *Journal of Statistical Planning and Inference*, *Computational Statistics & Data Analysis*, *Metrika*, *Methodology and Computing in Applied Probability* and *IIE Transactions on Quality and Reliability Engineering*. Presently, he is Editor-in-Chief for *Communications in Statistics - Series A and Series B*. Dr. Balakrishnan is a Fellow of the American Statistical Association and an elected member of the International Statistical Institute. He is an accomplished teacher, with best-teacher finalist nominations from three faculties at McMaster University in the past. Many master and Ph.D. students have obtained their degrees under Dr. Balakrishnan's supervision.

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