



Arthur Imperatore School of Sciences and Arts

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Department of Mathematical Sciences  
**Seminar in Stochastic Systems**

Dr. József Bukszár

Virginia Institute for Psychiatric and Behavioral Genetics  
Virginia Commonwealth University

*Lower and upper bounds for the probability  
of the union of finite number of events*

Tuesday, November 30, 2004  
4:00 pm  
Pierce 218

*Abstract:* The problem of finding lower and upper bounds for the probability of the union of finite number of events has a vast literature. A bound of this type is typically based on some probabilities of the intersections of events not more than a previously given number, the order of the bounds. These bounds provide us a powerful tool in a number of applications such as calculating the values of multivariate distribution functions, estimating network reliability and solving stochastic programming problems. We present lower and upper bounds by means of hypergraphs. The number of intersection probabilities the new upper (lower) bounds rely on is a linear (quadratic) function of the number of events. Thus, they provide us an effective method even in such applications where the intersection probabilities need to be evaluated. For a new bound an at least as good bound with higher order can be obtained. This enables us to improve on the bound algorithmically.

Joint work with Andrs Prkopa (Rutgers University) and partly with Tams Szntai (Budapest University of Technology and Economics, Hungary).

Dr. Bukszár obtained his MSc degree in mathematics and PhD in Operations Research and Statistics at the Eötvös Loránd University, Hungary. He is affiliated with the Virginia Institute for Psychiatric and Behavioral Genetics. Formerly, he was an assistant professor at the University of Miskolc, Hungary, and a postdoctoral fellow in the Bioinformatics Center of the University of Delaware. His research interests are in the area of statistical genetics and probability bounds.

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Refreshments will be served at 3:50 pm.

For more information contact Barbara Moh at [bmoh@stevens.edu](mailto:bmoh@stevens.edu) or call 201-216-5449.