

MATHEMATICS COLLOQUIUM

From the Garden of Branching Processes: Limit Theorems and Statistical Inference

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Abstract: Branching stochastic processes have very diverse applications in both mathematics and other sciences. I will begin with an introduction to branching processes pointing out some well-known connections with random graphs, random walks, and queuing models. Results regarding processes with migration and geometric random environments will be presented. The second part of the talk will discuss some recent results in statistics of branching processes with an application to epidemiology. The mathematical epidemiology makes use of branching stochastic processes in modeling the propagation of communicable diseases. We construct monotone empirical Bayes estimators for the reproduction parameter of a process with Poisson offspring. We study the estimators properties both analytically and through simulations. The results can be applied, for example, to evaluate the fraction of the community that needs to be vaccinated in order to prevent a major outbreak.

References

1. Yanev, G.P. Empirical Bayes estimators for the reproduction parameter of Borel-Tanner distribution. *J Applied Statistical Science*, NOVA Publishers, 15(2007) 1:27-33.
2. Yanev, G.P. and Mutafchiev, L. Number of complete N-ary subtrees on Galton-Watson family trees, *Methodology and Computing in Applied Probability*, 8(2006), 2:223-233, Springer.
3. Yanev, G.P. and Yanev, N.M. A critical branching process with stationary-limiting distribution, *Stochastic Analysis and Applications*, 22(2004), 3:721-738, Taylor & Francis.
4. Mitov, K., Pakes, A., and Yanev, G.P. Extremes of geometric variables with applications to branching processes. *Statistics and Probability Letters*, 65(2003), 4:379-388, Elsevier.

Date: Monday, **February 4, 2008**
Time: 4:00 pm – 5:00 pm
Place: J. Wiener Lecture Hall, MAGC 1.302

Refreshments will be served at 3:50pm.

For further information or for special accommodations, contact Dr. Karen Yagdjian at 381-2145, via email at yagdjian@utpa.edu, or visit www.math.panam.edu/colloquia.html