

中科院数学与系统科学研究院

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系列报告



中国科学院数学与系统科学研究院应用数学研究所



北京大学数学科学学院



北京师范大学数学科学学院

概率论联合讨论班

题目: On the Path to Extinction

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报告摘要: Populations can die in many ways. Arguably the most basic is extinction for intrinsic reasons, by stably insufficient, i.e. subcritical, reproduction. We consider (moderately) large, subcritical general branching processes, and ask what the time T to extinction is. It turns out that T has two components, both carrying weight, a deterministic part, proportional to the logarithm of initial population size, and a random part, with an approximate Gumbel distribution. Then we consider the path to extinction. How large will the population be at time uT , $0 < u < 1$? There is a beautiful limiting form, for large initial populations, of this as a stochastic process on the unit interval. For u close to one the approximation is bad but in the case of Markov branching process we can describe the last minutes before extinction. (Joint work with Fima Klebaner and Serik Sagitov, published in the Proc Nat. Acad. of US (2007) and J. Appl. Prob. (2007).)