

Large Deviation Rates for Controlled Branching Processes

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The topic of large deviation (LD) plays an important role on many results in statistics. In particular, in the field of branching processes the study of large deviations for the standard Bienaymé-Galton-Watson branching processes (BGWP) was initiated in [1] and [4] and investigated in detail in [1] and [3]. Among others results, the LD behavior of the statistic $R_n = \frac{Z_{n+1}}{Z_n}$ has been studied. This statistic has been used in the estimation of the amplification rate in a quantitative polymerase chain reaction (PCR) experiment where only Z_n and Z_{n+1} are observed. In this talk we will focus on LD results in the framework of controlled branching processes (CBP). These are a generalization of BGWPs where at each generation the number of progenitors is randomly chosen through a random control function. The aim of this work is to develop LD results for CBPs under an assumption on the exponential moments or polynomial moments of the offspring distribution and also based on the asymptotic behaviour of the harmonic moments of the generation sizes.

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