Estimation of the offspring mean in controlled branching processes with random control function: critical case

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The controlled branching process (CBP) with random control function provides a useful way to model generation sizes in population dynamics studies, where control on the growth of the population size is necessary at each generation. From a probabilistic viewpoint and in the framework of asymptotic linear growth of the expectation of the control variables, this model has been well studied; see González et al. (2005) and references therein. One of the main parameters describing the evolution of these models is known as the offspring mean. As in classical Galton-Watson process, this plays a crucial role as a threshold parameter, which drastically changes the behavior of the process in the three cases known as subcritical, critical and supercritical. However, few papers deal with the study of inference problems arising in this model. A first approach to these problems was established by Dion and Essebbar (1995) by considering a particular case of control function. Motivated by the work of Wei and Winnicki (1990), recently, Sriram et al. (2007) provided a unified estimation procedure to allow inference without the knowledge of the range of the offspring mean. In this talk, we present the weighted conditional least squares estimator of the offspring mean proposed in Sriram et al. (2007) and derive the asymptotic limit distribution of the estimator in the critical case.

References


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