

Monte Carlo Methods and Statistical Inference of Multitype Branching Processes

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Abstract : A parametric estimation of the MBP with Power Series offspring distribution family is considered in this paper. The MLE for the parameters is obtained in the case when the observable data are incomplete and consist only with the generation sizes of the family tree of MBP. The parameter estimation is calculated by using the Monte Carlo EM algorithm. The estimation for the posterior distribution and for the offspring distribution parameters are calculated by using the Bayesian approach and the Gibbs sampler. The article proposes various examples with bivariate branching processes together with computational results, simulation and an implementation using R.

Keywords : Bayesian, branching processes, EM algorithm, Gibbs sampler, Monte Carlo methods, statistical estimation

Conference Title : ICSM 2017 : International Conference on Statistics and Mathematics

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2017