Applications of the EM Algorithm in Multitype Branching Processes with Power Series Offspring Distributions [1]

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We consider the class of multitype branching stochastic processes with power series offspring distributions. In real situations it is difficult to observe the entire family tree up to the current generation. Often one can only register the progenitors and the total number of individuals in each generation. Hence one faces the need of statistical procedures dealing with unobservable data. In our work we use the EM algorithm to obtain the maximum likelihood estimators (MLE) of the offspring distribution parameters for the incomplete-data problem. Firstly, assuming that the entire family tree is observed, we obtain the maximum likelihood estimators of the parameters. Thereafter in the case of data based on generation sizes we propose an R implementation of the EM algorithm. The methods are illustrated via simulations and computational results.

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