

Simulation of multitype random forests

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Poster session
Tuesday-16:30

Multitype Bienaymé-Galton-Watson forests (MBGW) are one of the most well-known models for the evolution of populations, with different species coexisting. They have been applied to a wide variety of real-life problems in computer science, biology, demography, genetics, medicine, epidemics, among others. They also serve as an important tool in probability theory, used for example in combinatorics, random graphs and real trees. In this work we describe an algorithm to generate MBGW forests conditioned to have a given size by types, generalizing Devroye's algorithm (1988). For that, we generalize the concepts of multitype forests with a given degree sequence, Vervaat's transform, and the joint law of the size by types of a MBGW forest. As an application, we obtain an algorithm to simulate uniform multitype forests with given sizes by types, which are labeled, plane and binary.
