

1135-VN-719

Yingxiang Zhou* (yxzhou@udel.edu), 15 Orchard Rd, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, and **Pak-Wing Fok**. *Inference of transition rates in a birth-death chain from conditional extinction times.*

Consider a birth-death process (BDP) of length $N + 1$ with general birth-death rates, which has a maximum population of N and becomes extinct when the population reaches zero. In this talk, a method of recovering the birth-death rates of the BDP from its extinction times (ETs) is presented. Given that the maximum site n reached by each trajectory is also known, we use the proportion of trajectories that do not exceed n and corresponding mean ET to recover the birth-death rates sequentially from 1 to N . In each step, the method focuses on the coefficients of the characteristic polynomial of the matrix that governs the process, relates these coefficients to those in the previous steps in a recurrence relation, and solves for the rates at that site. In general, the initial error will propagate with the site number exponentially. However, with sufficient amount of input data, we can recover the rates with relatively small error. For instance, given 50 million ETs of an 11-site birth-death chain, we can recover the rates with a relative error about 3%. (Received September 13, 2017)