Estimation in Window-Censored Semi-Markov Processes

Consider a stochastic process that jumps among a finite set of states, with a random amount of time spent in between. In Semi-Markov processes these transitions follow a Markov chain and the sojourn times are governed by distributions $F_{ij}(t)$ that depend only on the connecting states, but not on the "history" of the process prior to the last jump. Suppose that the process started far in the past and that we are able to observe *n* copies of it during a finite length of time. We view these data as *n* i.i.d. double censored sample paths from a stationary semi-Markov process.

In this talk I explain my approach to estimating such process from window censored data, under either Maximum Likelihood or Penalized Maximum Likelihood. First I consider the problem parametrically by assuming Weibull distributions for the sojourn times. Next, I propose a non-parametric treatment by modeling the log-hazard function through linear splines. This generalization allows for processes with non-monotonic failure risks. In this talk I will for the most part address theoretical derivations, but computational aspects and interesting applications will also be discussed as extensively as time permits.