Estimating and Simulating NonHomogeneous Poisson Processes

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Abstract: Nonparametric techniques for estimating the cumulative intensity function of a nonhomogeneous Poisson process from one or more realizations on an interval \((0, S]\) are developed and illustrated. The cases considered here are estimating the cumulative intensity function from:

- exact event event times from \(k\) realizations on \((0, S]\),
- exact event event times from \(k\) overlapping realizations on \((0, S]\),
- counts of events on intervals on \((0, S]\).

The first two cases do not require any arbitrary parameters from the modeler. In all three cases, the estimated cumulative intensity function can be used to generate a point process for simulation by inversion.

Key Words: Discrete-Event Simulation, Nonparametric Estimation, Point processes, Repairable Systems.