Title: Identification of almost unstable Hawkes processes

Author(s): Vilmos Prokaj and Balázs Torma

Self-exciting point processes, also called Hawkes processes are widely used to model credit events (defaults) on bond markets in financial mathematics. This is a point process whose intensity is defined via a feedback mechanism where the input is the past of the point process itself. The identification (calibration) of Hawkes processes is a hot research area. In this paper we consider Hawkes processes in which the feedback path is defined by a finite dimensional linear system. This feedback system admits a stationary solution, i.e. stable, if the integral of the impulse response function of the feedback path is strictly less than one. In this paper we calculate the limit distribution of the appropriately rescaled state process from which we conclude that the intensity process has a diffusion limit. Simulation results for the standard Hawkes process are also presented.

Address:
Vilmos Prokaj
Eötvös University Budapest
Department of Probability and Statistics
Computer and Automation Institute of the Hungarian
Academy of Sciences

Address:
Balázs Torma
Computer and Automation Institute of the Hungarian
Academy of Sciences