Séminaire de Probabilités et Statistique

Mardi 3 mai à 14h00

Salle de conférences

Céline Duval

Université de Lille

Interacting Hawkes processes with multiplicative inhibition

After a short introduction on Hawkes processes, we introduce a general class of mean-field interacting nonlinear Hawkes processes modelling the reciprocal interactions between two neuronal populations, one excitatory and one inhibitory. The model incorporates two features: inhibition, which acts as a multiplicative factor onto the intensity of the excitatory population and additive retroaction from the excitatory neurons onto the inhibitory ones. We detail the well-posedness of this interacting system as well as its dynamics in large population. The analysis of the long-time behavior of the mean-field limit process can be explicated. We illustrate numerically that inhibition and retroaction may be responsible for the emergence of limit cycles.

Joint work with E. Luçon and C. Pouzat.