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Inference of Hawkes processes from imperfect data

Hawkes processes are a family of point processes for which the occurrence of any event increases the probability of further events occurring.

Although the linear Hawkes process, for which a representation in the form of a superposition of branching processes exists, is particularly well studied, difficulties remain in estimating the parameters of the process from imperfect data (noisy, missing or aggregated data), since the usual estimation methods based on maximum likelihood or least squares do not necessarily offer theoretical guarantees or are numerically too costly.

In this talk, we present a spectral approach well-adapted to this context, for which we proved consistency and asymptotic normality in a previous work.

We illustrate this approach for noisy data, and show that identifiability of the model becomes an issue in this case, but can be alleviated under additional assumptions.

Joint work with Anna Bonnet, Miguel Martinez and Maxime Sangnier.