ESTIMATION OF HAWKES PROCESSES. APPLICATION TO FINANCE

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Nowadays, Hawkes processes are commonly used in many applications. Building efficient and accurate estimation procedures is of uppermost importance. It can be very difficult, especially in the context of large dimension. Most available procedures have been developed in the context of parametric estimation and very few correspond to nonparametric estimation. We introduce a new nonparametric method that allows for a direct, fast and efficient estimation of the matrix of kernel norms of a multivariate Hawkes process, also called branching ratio matrix. We demonstrate the abilities of this method by applying it to high-frequency financial order book labelled data (i.e. each order is labelled by an agent id allowing us to identify all the orders that were sent by a given agent). Agent-based Hawkes models are shown to characterise the behaviour of each agent and analyse very precisely their contributions to diffusive daily volatility.