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Title: Modelling assets volatilities and correlations

Abstract: We will present two different approaches for modelling diffusive volatility or diffusive correlations of asset using Hawkes processes or variations of Hawkes processes.

In a first approach, thanks to the access to labeled orders on the Cac40 index future provided by Euronext, we are able to quantify market participants contributions to the volatility and correlation in the diffusive limit. To achieve this result we leverage the branching properties of Hawkes point processes. We find that fast intermediaries (e.g., market maker type agents) have a smaller footprint on the volatility than slower, directional agents. The branching structure of Hawkes processes allows us to examine also the degree of endogeneity of each agent behavior.

In a second approach, we introduce a novel Hawkes based model for modelling two assets volatilities and correlation. This model involves a shot noise process that is directly responsible for exogeneous correlation of the two different assets. We present an estimation procedure that is able to estimate both the intensity of the shot noise and the Hawkes parameters. The model is shown to reproduce several stylized facts.