

# High-frequency financial data modeling using Hawkes processes

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We propose a marked point process model for the excesses of high frequency time series over a high threshold that combines Hawkes processes for the exceedances with a generalized Pareto distribution model for the marks (exceedance sizes). Risk measures such as intraday Value-at-Risk (VaR) are of interest for market participants involved in high-frequency trading. The conditional approach features intraday clustering of extremes and is used to calculate instantaneous conditional VaR. Maximum likelihood estimation is computationally intensive; we use a differential evolution genetic algorithm to find adequate starting values for the optimization process. The models are backtested on real data.