Global jump filters and realized volatility

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Abstract:
For a semimartingale with jumps, we propose a new estimation method for the integrated volatility, i.e., the quadratic variation of the continuous martingale part, based on the global jump filter proposed by Inatsugu and Yoshida (1). To decide whether each increment of the process has jumps, the global jump filter adopts the upper alpha-quantile of the properly scaled absolute increments as a threshold. This jump filter is called global since it uses all the observations to classify one increment. We give a rate of convergence and prove asymptotic mixed normality of the global realized volatility. By simulation studies, we show that our estimators outperform previous realized volatility estimators that use a few adjacent increments to mitigate the effects of jumps. Related to the statistical part of the talk, some limit theorems for a robustified quadratic variation with anticipative weights are to be discussed with the Malliavin calculus.

References:
1. Inatsugu, H., Yoshida, N.: Global jump filters and quasi-likelihood analysis for volatility. Annals of the Institute of Statistical Mathematics, on-line (2021)
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3. Yoshida, N.: Asymptotic expansion of a variation with anticipative weights. arXiv:2101.00089 (2020)