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Estimating the quadratic covariation of non-synchronously observed Itô processes

ABSTRACT. In the statistical model where two Itô processes are observed on a fixed time span at general non-synchronous discrete observation times, the standard estimation for the quadratic covariation by a corresponding realized measure is infeasible. The estimator by Hayashi & Yoshida (2005) is presented as a solution to this problem. We consider an asymptotic distribution theory in a high-frequency setting and establish a stable weak convergence result. The influence of asynchronicity on the asymptotic mixed normal limiting distribution compared to the synchronous setting is elucidated.

Devoted to the model that the processes are observed with additive noise perturbation, which has been stimulated for modeling high-frequency financial intra-day data and accommodate for market microstructure effects as bid-ask spreads, we suggest a combined approach with subsampling methods.

Hayashi, T. & N. Yoshida (2005). On covariance estimation of non-synchronously observed diffusion processes. *Bernoulli* 11(2), 359–379.