

Limit Theorems for the Empirical Distribution Function of Scaled Increments of Ito Semimartingales at High Frequencies

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We derive limit theorems for the empirical distribution function of “devolatilized” increments of an Ito semimartingale observed at high frequencies. These “devolatilized” increments are formed by suitably rescaling and truncating the raw increments to remove the effects of stochastic volatility and “large” jumps. We derive the limit of the empirical cdf of the adjusted increments for any Ito semimartingale whose dominant component at high frequencies has activity index of $1 < \beta \leq 2$, where $\beta = 2$ corresponds to diffusion. We further derive an associated CLT in the jump-diffusion case. We use the developed limit theory to construct a feasible and pivotal test for the class of Ito semimartingales with non-vanishing diffusion coefficient against Ito semimartingales with no diffusion component. Joint work with Viktor Todorov.