Discretization error of stochastic integration

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Abstract

Limit distributions for the error in approximations of stochastic integrals by Riemann sums with stochastic partitions are studied. The integrands and integrators are supposed to be one-dimensional continuous semimartingales. Lower bounds for asymptotic conditional variance of the error are given and effective discretization schemes which attain the bounds are explicitly constructed. Two examples of their applications are given; efficient delta hedging strategies under fixed or linear transaction costs, and effective discretization schemes for the Euler-Maruyama approximation are constructed.