Mathematics > Probability

Efficient Discretization of Stochastic Integrals

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Sharp asymptotic lower bounds of the expected quadratic variation of discretization error in stochastic integration are given. The theory relies on inequalities for the kurtosis and skewness of a general random variable which are themselves seemingly new. Asymptotically efficient schemes which attain the lower bounds are constructed explicitly. The result is directly applicable to practical hedging problem in mathematical finance; it gives an asymptotically optimal way to choose rebalancing dates and portofolios with respect to transaction costs. The asymptotically efficient strategies in fact reflect the structure of transaction costs. In particular a specific biased rebalancing scheme is shown to be superior to unbiased schemes if transaction costs follow a convex model. The problem is discussed also in terms of the exponential utility maximization.

Subjects: **Probability (math.PR)**; Computational Finance (q-fin.CP); Portfolio Management (q-fin.PM)

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