

Stochastic analysis based on simple, symmetric random walks

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Abstract

It seems interesting that a large portion of stochastic analysis can be rebuilt by almost sure, pathwise approximation using simple, symmetric random walks. This method gives a construction of Brownian motion and continuous local martingales in general, local times, stochastic integration with respect to continuous local martingales, Itô formulas, fractional Brownian motion, Feynman–Kac formulas, and many more. The author hopes that this method is more transparent and technically less demanding – so pedagogically more advantageous – than other existing methods.

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