

# Self-intersection local time of planar Brownian motion based on a strong approximation by random walks

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The main purpose of the present talk is to define planar self-intersection local time by an alternative approach which is based on an almost sure pathwise approximation of planar Brownian motion by simple, symmetric random walks. As a result, Brownian self-intersection local time is obtained as an almost sure limit of elementary, random walk self-intersection local times. An important tool is a discrete version of the Tanaka–Rosen–Yor formula, whose almost sure limit is the well-known continuous version of the formula. The author hopes that this approach to self-intersection local time is more elementary than other existing ones.