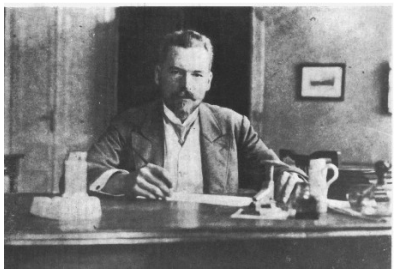

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Selected properties of integrated stochastic processes

Thursday, September 6, 2018 3:00 PM (3 hours)

Brownian motion (Wiener process) and Ornstein-Uhlenbeck processes are two basic stochastic processes, which are frequently, among others, used in the statistical physics. We consider the full stochastic dynamics, i.e. a situation when a particle is described by the position and velocity. It is assumed that velocity changes according to Wiener or Ornstein-Uhlenbeck processes. Consequently, a particle position is described by an integrated stochastic process. We examine such processes in the free case. Moreover, the problem of first escape from a finite interval for integrated stochastic processes is studied. We show similarities and differences between both processes. These differences arise due to introduction of damping and are especially well visible for a free particle. In the studied range, the problem of first escape seems to be less sensitive to the process describing evolution of the velocity.

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