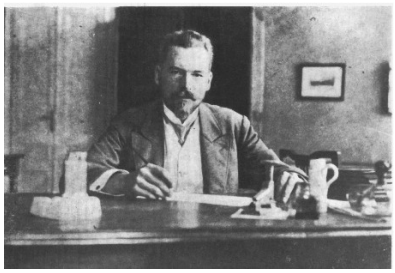

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The role of the Laplace distribution in stochastic resetting

Tuesday, 28 September 2021 17:10 (20 minutes)

Diffusion with stochastic resetting is very popular in the study of many phenomena in physics, biophysics, chemistry. A wide diversity of random processes and restart mechanisms are widespread in nature, science and technology. As a stochastic process under resetting, we consider a subordinated Brownian process, and the restart time is exponentially distributed with constant rate. In this case the stationary state has the Laplace distribution in which the scaling parameter is dependent on the Laplace exponent of the random process directing Brownian motion as a parent process. The directing process may be taken from a wide set of infinitely divisible random processes. Changing the subordinator, we can modify the parameter, but the stationary state still obeys the Laplace distribution. If the linear potential acts on the subordinated Brownian motion under resetting, this leads to an asymmetric form of the Laplace distribution. If Brownian motion becomes Lévy flights, due to resetting the stationary state has the Linnik distribution, generalizing the Laplace case in the sense of geometrically infinitely divisible distributions. This analysis includes the ordinary diffusion with resetting as a particular example.

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