Journal of Physics Research, Vol. 23, No. 1, 2023
DOI: 10.47176/ijpr.23.1.21612

The effects of random reset on the dynamics of a non-Markovian random walk

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(Received 2 December 2022; in final form 24 January 2023)

Abstract
Resetting in stochastic systems is defined in different ways. In this research, a 1D non-Markovian random walk is considered. In this process, the reset changes the dynamics in a way where the random walker, after losing its memory, goes back to a fixed point in space and starts again. In this study we investigate time evolution and also the long-time limit of displacement moments in the presence of resetting. Our calculations in the long-time limit show that the probability distribution function for displacement reaches a steady-state. On the other hand, this distribution never gets to a Gaussian form for any values of the resetting rate. We will show that, in contrast to the case where the process does not undergo resetting, the moments accumulate to finite values. This is confirmed by doing Monte Carlo simulations.

Keywords: resetting, random walk, non-Markovian process, persistent, master equation

For full article, refer to the Persian section