# INVESTIGATING PROBLEMS OF ENCOUNTERS BETWEEN PARTICLES PERFORMING A RANDOM WALK

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## Abstract

*The article deals with problems of encounters between particles performing a random walk over a finite (or a countable) set and an infinite set, including those that employ Fourier series to obtain a solution. We derive the probability of an encounter between two particles for a Bernoulli random walk. We investigated the problems of two particles approaching each other while performing a random walk over a continuous set, and of particles encountering each other during a random walk over a discrete cyclically ordered set. We present the problem of the first encounter and a method of reducing it to the problem of attaining a set. We study the limit behaviour of the particle encounter probability for high random walking time in each problem. We show how to apply Laplace integrals to seeking the limit probability for the encounter of two particles performing a random walk over an infinite set.*

**Keywords**

*Markov processes, random walks, stationary distribution, Cartesian product, Fourier series, Laplace's method, Bernoulli distribution*



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