# On the cover time of a simple random walk

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## Abstract

Imagine that a particle starts from the origin of the $x$-axis and moves at times $t = 0, 1, \ldots$ one step to the right or one step to the left according to the following rule: If the particle is at the point $x = i$, it goes right or left with the same probability 1/2. For this model, it is usually called a simple random walk.

For a simple random walk, define the cover time to be the time when the number of points visited has just increased to a given number $i$, $i \in \{0, 1, 2, \ldots\}$. In this talk, we first use the first step analysis to study the cover time of a simple random walk.

Then we consider two models with some restrictions on a simple random walk. For these two models, we also investigate the corresponding cover time, respectively.

Keywords: the first step analysis, random walk, cover time