

Maximizing survival time in a random walk on an interval

Ewa M. Kubicka, Grzegorz Kubicki, Małgorzata Kuchta,
and Michał Morayne

Abstract

A gambler buys N tokens that enable him to play N rounds of the following game. A symmetric random walk on a discrete interval $\{-r, \dots, r\}$ starts from the point 0. The gambler knows only the number of steps made so far, but is unaware of the current position of the walk. Once the walk hits one of the barriers $-r$ or r for the first time in the current round, the round ends with no payoff. The gambler can start a new round by inserting a new token, if there are any tokens left. The gambler can end the game at any time getting the payoff equal to the number of steps made in the current round. We find the optimal stopping strategy for this game and calculate the expected payoff once the optimal strategy is applied.