Inequalities for the mean time to reach the level by a random walk with delay at zero

Vladimir LOTOV
Sobolev Institute of Mathematics, Russia,
E-mail: lotov49@mail.ru

Abstract:

Let $X_1, X_2, \ldots$ be a sequence of i.i.d. random variables, and

$$W_{n+1} = \max\{0, W_n + X_{n+1}\}, \qquad W_0 = 0.$$

We introduce stopping time

$$T = \inf\{n \geq 1 : W_n \geq b\}, \qquad b > 0.$$

The goal is to obtain two-sided inequalities for ET under conditions $EX_1 > 0$ and $EX_1 < 0$. These bounds are then used to characterize the quality of the sequential procedure of cumulative sums (CUSUM procedure) for the early detection of change in distribution.