

Exercise for the lecture
Algorithms for Radio Networks
Winter 2011/12
Sheet 8

EXERCISE 8:

Consider the following random walk model with $i = \{1, \dots, n\}$ steps in a one-dimensional world. For step $i = 1$ start at $x_1 = 0$ and choose a random velocity $v_1 \in [0, 1]$. Move according to the chosen velocity until a distance of 1 m is traveled.

Now start at this point x_i , choose a new velocity $v_i \in [0, 1]$, move for 1 m to point x_{i+1} . Repeat this step until forever.

1. Use an appropriate programming language and simulate the random walk model. Run a long random walk of at least $n = 1000$ steps. Run sufficient repeats this random walk. Note down the times, the velocities and the traveled distances.
2. What is the expectation of the average velocity after 1, 10, 100, and after 1000 steps?
3. What is the probability density of the travel times after 1, 10, 100, and after 1000 steps?

You may support your results by some nice plots.