Suppose a snail chooses a direction uniformly at random and walks a random distance d_{free} according to some distribution. The snail then repeats the process. However, if the snail turns in a direction that faces its trail, it walks a distance d_{trail} chosen uniformly at random between 0 and the distance to the trail.
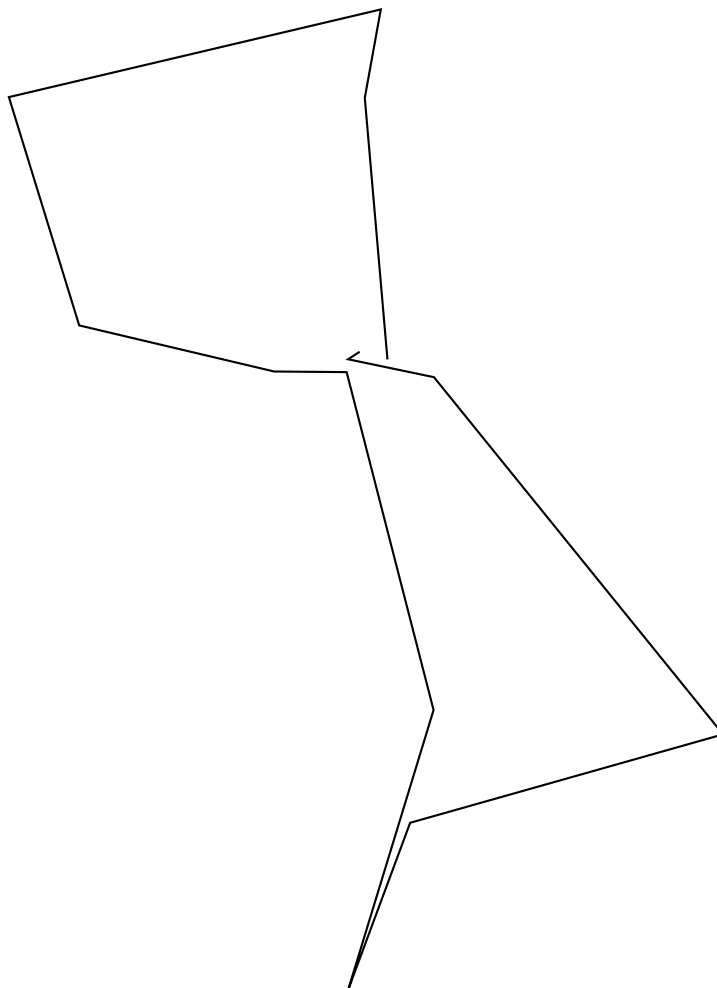

Figure 1: An (actually) random walk where the change in x and y were independently chosen from a Gaussian distribution. Is the snail likely to escape from its confine for good?

Question. What is the probability that the walk is unbounded?

Related.

1. If the walk is bounded with probability 1, what is the expected distance of the walk?

2. What if the angle is chosen uniformly at random from $\{2\pi/n, 4\pi/2, \ldots 2(n-1)\pi/n\}$? And d_{free} is uniform on $[0, 1]$.

3. What is the expected number of (avoided) collisions after k steps?