EE 193 - Applied Probability and Statistics for Engineers
Department of Electrical and Computer Engineering
Tufts University Fall 2007
Problem Set #1 Distributed September 7, 2007
Due Sept. 20, 2007

Problem 1

Poor old Prof. Mash may have had a bit too much to drink at the latest faculty meeting and has been pulled over by the local constabulary after a bit of erratic driving. To ascertain just how much of a danger the good professor is to the public, he is asked to walk a straight line. Being somewhat compulsive, Mash takes one step forward (exactly 1 m) each and every second. Unfortunately, he is also somewhat, shall we say, wobbly, and with each step forward there is a chance he also moves to the right or to the left. Specifically, with probability 1/3 he moves 1 m to the left with each step, with probability 1/3 he goes to the right, and with probability 1/3 he only moves forward (i.e., no sideways wobble). More formally, let x be the axis along which Prof. Mash is *supposed* to be walking and y the perpendicular direction of wobble.

(a) What is the sample space for this problem in the case where the professor is allowed to take an infinite number of steps.

(b) Find the probability law for the location of the professor after three seconds.

(c) What is the probability that after 10 seconds Prof. Mash is located at $x = 10$m and $y = 0$m.

(d) Prof. Mash will be thrown in the slammer if he deviates by at most 1 m to the right or to the left at any point along his walk. Let n be the number of seconds the police allow Mash to walk. What is the probability as a function n that poor Prof. Mash is going to need to call the local bail bondsman?

Problem 2

Yates and Goodman problems

- 1.2.1 (a)–(c)
- 1.3.2
- 1.4.1
- 1.4.4 parts (a) and (c)
- 1.4.7
- 1.5.5
- 1.11.2