1 Homework 06

You will find all the problems for this homework in this document. You are responsible for uploading a pdf document with all of your results and the necessary work to the Canvas shell for the class. Please make sure that your homework pdf is legible, clear, and pledged.

1. We perform an experiment where a person is selected at random from Stevens, let A be the event that an undergraduate student is chosen, and let B be the event that a graduate student is selected. Note that it is possible to have a person who is both undergraduate and graduate (the accelerated masters program) and its possible to have someone who is not either (such as your professors). What are the atoms for this experiment?

2. For a symmetric random walk $M(n)$, use its moment generating function to determine its third and fourth moments.

3. Define a random walk $W(n)$ where

$$W(n) = \sum_{i=1}^{n} 2X_i(\omega_i)$$

and

$$X_i(\omega) = \begin{cases} 1 & \omega = H \\ -1 & \omega = T \end{cases}$$

and let the $\mathbb{P}(\omega_i = H) = 2/3$. Determine the moment generating function of $W(n)$ and use this to get the first two moments of this random walk (for an arbitrary integer $n > 0$).

