ECE 341 - Homework #4

Binomial and Uniform Distributions. Summer 2023

Binomial Distribution

Assume you roll a 10-sided die. You win on a 1 or 2, lose on 3..10 (p = 0.2)

$$X(z) = \left(\frac{0.8z+0.2}{z}\right)$$

1) Determine the probability of winning 4 times out of 10 rolls

2) Determine the probability distribution when rolling this die 10 times

NOAA has been keeping track of world weather for the past 142 years. 27 of last 30 years have been in the 30 hottest years on record.

3a) What is the probability of any given year being one of the 30 hottest on record (i.e. what is p?)

3b) What is the probability of 27 of the last 30 years being the hottest on record?

Uniform Distribution

Assume a fair six-sided die:

$$Y(z) = \left(\frac{1}{6}\right)\left(\frac{z^5+z^4+z^3+z^2+z+1}{z^6}\right)$$

4) Assume you roll 6 dice (6d6 or a level-6 fireball). Determine the

- pdf
- mean and standard deviation
- The probability of doing 30 or more damage with a level-6 fireball

5) Assume you roll 12 dice (12d6 or a level-12 fireball). Determine the

- pdf
- mean and standard deviation
- The probability of doing 50 or more damage with a level-12 fireball

6) Assme you roll two 4-sided dice, three 6-sided dice, and four 8-sided dice and take the sum:

Y = 2d4 + 3d6 + 4d8

Determine

- The pdf for Y
- The mean and standard deviation of Y, and
- The probability that the sum is 40 or more