

ECE 341 - Homework #3

Dice Games and z-Transform - Summer 2023

Yahtzee (5 dice)

In the game of Yahtzee, you roll five dice.

- You can then keep whichever dice you like and re-roll the rest.
- You can then do this a second time.

Whatever the results are after three rolls scores points. A Yahtzee is when you roll 5-of-a-kind.

1) Compute the odds of rolling a full-house when rolling 5 dice one time

$$\text{dice} = xxx yy$$

2) Compute the odds of rolling four-of-a-kind when rolling 5 dice one time

$$\text{dice} = xxxx y$$

3) Compute the odds of rolling three-of-a-kind when rolling 5 dice one time

$$\text{dice} = xxx y z$$

4) Write a Matlab program which computes the number of ways to roll five dice and

- Get a full house
- Get 4-of-a-kind, and
- Get 3-of-a-kind

Compare your answers to what you computed using combinatorics

z-Transforms

Find the inverse z-transform

$$5) \quad X = \left(\frac{0.01z^2}{(z-0.98)(z-0.96)(z-0.9)} \right)$$

$$6) \quad X = \left(\frac{0.1(z-0.9)}{(z-1)(z-0.95)(z-0.8)} \right)$$

7) A new Ford F150-Lightning costs \$72,314 from Cars.com. If you take out a 60-month loan at 4.74% interest, what is your monthly payment? Solve using z-transforms.