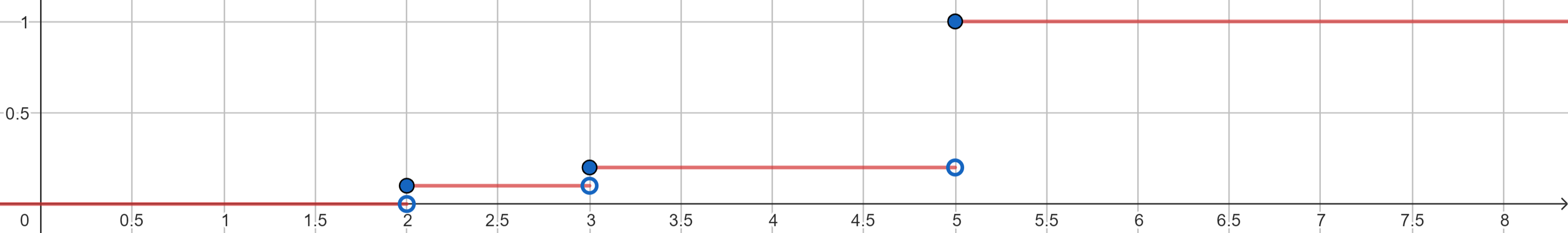
ECO394D Probability and Statistics Homework 3

Sibo Ding

Summer 2023

## Problem 1

### Part A



### Part B

1. As ,
2. If ,   
   If ,   
   If ,
3. for   
   0 otherwise

## Problem 2

### Part A

<https://math.stackexchange.com/questions/620045/mean-and-variance-of-squared-gaussian-y-x2-where-x-sim-mathcaln0-sigma>

### Part B

Markov’s calculation on expected speed is correct, but his calculation on expected time is wrong. The expected time is not “distance divided by expected speed”. It is calculated from the time of each event, like below:

## Problem 3

because , when is uniform on   
<https://en.wikipedia.org/wiki/Inverse_transform_sampling#Proof_of_correctness>

## Problem 4

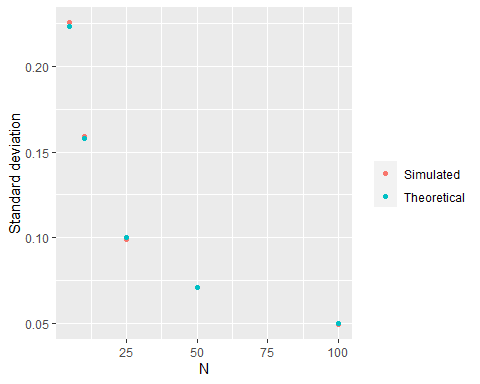
### Part A

### Part B

Theoretical ,   
Simulated mean and sd of

## [1] 0.49754

## [1] 0.2257765



Comment: Standard deviation decreases as increases.

## Problem 5

for all   
  
 (independent)  
 (identical)

<https://en.wikipedia.org/wiki/Order_statistic>