Assignment 5

Introduction to Probability and Statistics

April 3, 2025

Problem 1. (10 points) Consider the dataset weight-height.xls. Assuming that the weight and height follow a normal distribution, and that the variance is known and equal to the sample variance for each case, find a 95% confidence interval for the weight and height for men and women respectively.

Problem 2. (10 points) Consider X to be a random variable that follows a normal distribution with mean $\mu = 5$ and $\sigma^2 = 1$. Find:

a) The pdf.

b) The probability that X is greater than 6.

c) The probability that X is greater than 3 but less than 6.

d) The expected value and the variance.

Problem 3. (10 points) Consider a normal population with variance known to be $\sigma^2 = 4$. Consider a sample of 1000 observations with sample mean $\bar{x} = 123$.

a) Find a 99% confidence interval for the actual mean.

b) Find a 95% confidence interval for the actual mean.

c) Which number of observations would you need so the confidence interval has length less or equal than $E = 0.1$.

d) The expected value and the variance.

Problem 4. (10 points) Consider an exponential distribution with parameter $\lambda = 2$.

a) Find the pdf.

b) Find the mean and the variance.

c) Suppose now that there is an exponential family with variance $\sigma^2 = 4$. Find the p.d.f for that particular distribution.