

Statistical Method

Homework 2

Due data: 23:59, September 25, 2023

1. Give the sample space (domain), probability density function, mean, and variance of the following distributions:
 - (a) Poisson distribution with rate $\lambda = 3$.
 - (b) Geometric distribution with probability $p = 1/3$.
 - (c) Normal distribution with $\mu = 0$ and $\sigma = 1$.
 - (d) Exponential distribution with rate $\lambda = 2$.
 - (e) Laplace distribution with location parameter $\mu = 0$ and scale parameter $b = 1/2$.
 - (f) Gamma distribution with shape parameter $\alpha = 10$ and rate parameter $\lambda = 1/2$.
 - (g) Chi-square distribution with degree of freedom 20.
2. Given two datasets,
 - (a) Please provide the histograms of two datasets.
 - (b) For each dataset, add the probability density functions of the given distributions (c)-(g) in **Question 1** to the figures in **Question 2(a)**. Trying to select more suitable distributions to the data based on your opinion.

Hints in R:

- (a) Poisson: `dpois(...)`
- (b) Geometric: `dgeom(...)`
- (c) Normal: `dnorm(...)`
- (d) Exponential: `dexp(...)`
- (e) Laplace:
`install.packages("extraDistr")`
`library(extraDistr)`
`dlaplace(...)`
- (f) Gamma: `dgamma(...)`
- (g) Chi-square: `dchisq(...)`