

Assignment 4: Likelihood Function/Maximum Likelihood Estimator

Resource:

H. Pishro-Nik, "Introduction to probability, statistics, and random processes", available at <https://www.probabilitycourse.com>, Kappa Research LLC, 2014.

Helpful Reminder: Often when working with maximum likelihood functions, out of ease, we maximize the log-likelihood rather than the likelihood to find the maximum likelihood estimator.

Question 1: (20 points)

Let X_1, \dots, X_4 be a random sample from an Exponential(θ) distribution. Suppose we observed $(x_1, x_2, x_3, x_4) = (2.35, 1.55, 3.25, 2.65)$. Find the likelihood function. What is the best estimate for θ ?

Question 2: (20 points)

Let X_1, \dots, X_4 be a random sample from a Geometric(θ) distribution. Suppose we observed $(x_1, x_2, x_3, x_4) = (2, 3, 3, 5)$. Find the likelihood function. What is the best estimate for θ ?

Question 3: (30 points)

Let X_1, \dots, X_5 be a random sample from a Poisson(θ) distribution. Suppose we observed $(x_1, x_2, x_3, x_4, x_5) = (2, 3, 1, 4, 3)$. Find the likelihood function. What is the best estimate for θ ?

Question 4: (30 points)

Let X_1, \dots, X_4 be a random sample from a $N(0, \theta^2)$ distribution. Suppose we observed $(x_1, x_2, x_3, x_4) = (2.1, -1.3, 0.3, -0.5)$. Find the likelihood function. What is the best estimate for θ ?

Assignment Submission

1. In print format, all computer processed, submitted in my office.
2. Full compliance with guidelines
3. Deadline for the submission is Tuesday November 9th before noon (11:59 AM.)