Engineering Mathematics II (ED 121)

Homework 8

Release Date: 02.04.2024
Due Date: 7.03.2024

1. If $X_1, X_2, \ldots, X_n$ is a random sample from a distribution with density function

$$f(x; \theta) = \begin{cases} (1 - \theta)x^{-\theta} & \text{if } 0 < x < 1 \\ 0 & \text{elsewhere,} \end{cases}$$

   what is the maximum likelihood estimator of θ ?

2. Let $X_1, X_2, \ldots, X_n$ be a random sample from a normal population with mean μ and variance σ^2. What are the maximum likelihood estimators of μ and σ^2 ?

3. Suppose you are given a dataset consisting of the following three points:

$$(x_1, y_1) = (1, 2),$$
$$(x_2, y_2) = (2, 4),$$
$$(x_3, y_3) = (3, 6).$$

   You want to perform linear regression to fit a line to this dataset using the equation $y = mx + b$. Find m and b.

4. Do a polynomial regression(degree 2) of the above problem.