Homework 3

STA321

Due Feb. 26

The problems are continuation of the Homework # 2. So I left the questions of Homework 2 here as a reference. You only need to do the new questions.

1. Given n independent observations: $X_1, X_2, \cdots, X_n$ with a density function given by

$$f(x) = x^3 e^{-x/\theta} \frac{1}{6\theta^4} \quad \text{for} \quad x > 0.$$

where $0 < \theta$ is the unknown parameter. Find the MLE of θ based on the n observations.

[do not forget to check the second derivative to make sure it is a max]

HW 3: Find the Fisher information for the above setting:

(a) the expected Fisher information.

(b) if the observations are $X_1 = 3, X_2 = 5, X_3 = 1.3, X_4 = 5.1, X_5 = 6.2, X_7 = 3.3$ compute the observed Fisher information.

2. **The derivative do not exist, so we have trouble define Fisher information here. No more work for this question.**

Given n independent observations $X_1, X_2, \cdots, X_n \sim Unif(0, \theta)$. where $0 < \theta < \infty$ is the unknown parameter. Find the MLE of θ.

[hint: derivative do not work here.]

3. Suppose $Y_1, Y_2, \cdots, Y_n$ are independent with a Poisson distribution with unknown parameter λ.

Find MLE of λ.

HW 3. (a) Find the expected Fisher information here.

(b). If $X_1 = 2, X_2 = 4, X_3 = 1, X_4 = 0, X_5 = 2$, find the observed Fisher information here.