Assignment8

NIMMALA AVINASH(CS21BTECH11039)

IITH

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Outline

- Question
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Question:

The time to failure of a bulb is a random variable x with density $ce^{-cx}U(x)$. We test 80 bulbs and find that 200 hours later, 62 of them are still good. Find the ML estimate of c.

Solution:

The probability

$$p = 1 - F_X(200) = e^{-200c}$$

of the event $X > 200$ is a monotone decreasing function of c. To find the ML estimate $\hat{c}$ of c it suffices to find the ML estimate $\hat{p}$ of p.

$$\hat{p} = \frac{62}{80} = 0.775 \tag{1}$$

$$p = e^{-200c} \tag{2}$$

$$ln(p) = -200c \tag{3}$$

$$\implies c = -\frac{1}{200} ln(\hat{p}) \tag{4}$$

$$c = 0.0013 \tag{5}$$