

Problem 3 - 25 points

Say the elements x_n of an **N -dimensional** vector \mathbf{x} are **independent** and identically distributed random variables, each with an Exponential pdf :

$$p(x_n|\lambda) = \lambda \exp(-\lambda x_n) \quad \text{for } x_n > 0$$

Therefore,

$$\begin{aligned} p(\mathbf{x}|\lambda) &= \prod_{n=1}^N p(x_n|\lambda) \\ &= \prod_{n=1}^N \lambda \exp(-\lambda x_n) \quad \text{for } x_n > 0 \end{aligned}$$

Determine the **MLE estimate** of λ (i.e., determine $\hat{\lambda}(\mathbf{x})$).

Hint: Recall that $e^x e^y = e^{x+y}$.