



DEPARTMENT OF ELECTRONICS &
COMMUNICATION
Pattern Classification (Code: ECEM-208)

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Date: 25/05/2017 Deadline: Monday (03/07/17) Morning *Homework 3 for M.Tech (CIT) ECE (II Sem)*

1. Suppose X_1, X_2, \dots, X_n are *i.i.d.* random variables with density function

$$f(x|\sigma) = \frac{1}{2\sigma} e^{-\frac{|x|}{\sigma}}, \quad (1)$$

find the maximum likelihood estimate of σ .

2. The Pareto distribution has been used in economics as a model for a density function with a slowly decaying tail:

$$f(x|x_0, \theta) = \theta x_0^\theta x^{-\theta-1}, x \geq x_0, \theta > 1 \quad (2)$$

Assume that $x_0 > 0$ is given and that X_1, X_2, \dots, X_n is an *i.i.d.* sample. Find the MLE of θ .

3. In wireless communication the fading coefficient for particular channel is modelled as Rayleigh distributed random variable. Channel estimation is vital in 4G and 5G communication standards. One of the ways to estimate the channel is via ML estimate. Hence find the ML estimate of coefficient θ of following rayleigh distribution, whence the samples H_1, H_2, \dots, H_n are drawn *iid* from this distribution:

$$f(h|\theta) = \frac{h}{\theta} e^{-\frac{h^2}{2\theta}} \quad (3)$$

4. Problem 2 (chapter 4) from Duda and Hart
5. Problem 3 (chapter 4) from Duda and Hart

Note: I know that most of you have solution manual. To problem 4 and 5 are little hard. Hence first try yourself and then see the solution. One will get more points if the solution is original. If you copy the solution directly, you will not learn anything.