Stochastic Processes December 21, 2021
Sharif University of Technology CE 40-695
Dr. H.R. Rabiee

Time: 20 mins

Name: Std. Number:

Quiz 7 (Estimation, Bayes Rule)

Questions

1. (50%) Let X be a random variable with pdf: $f(x \mid \theta) \sim$ Geometric (θ)

$$f(x \mid \theta) = \theta(1-\theta)^{x-1} \quad x = 1, 2, \ldots$$

Let $\Pi(\theta) = \begin{cases} 2\theta & 0 \leqslant \theta \leqslant 1 \\ 0 & \text{otherwise} \end{cases}$

Find the MAP estimate of θ given $X = 3$.

2. (50%) For the following PDF assuming that we have n i.i.d. samples from this distribution and $x_0 > 0$, find an estimation of θ using method of moments.

$$f\left(x \mid x_0, \theta\right) = \theta x_0^{\theta} x^{-\theta-1}, x \geq x_0, \theta > 1$$