Math 5411 – Mathematical Statistics I– Fall 2024
w/Nezamoddini-Kachouie

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Homework Short #2 – October 2, 2024

1. Replace rate (λ) and rather use scale $\beta = 1/\lambda$ in Gamma probability density function and derive it based on scale.

$$f(x|\alpha,\beta) = \begin{cases} \frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\beta} \\ 0 \qquad\qquad \text{otherwise} \end{cases}$$

$$f(x|\alpha,\lambda) = \begin{cases} \frac{\lambda^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-x\lambda} \\ 0 \qquad\qquad \text{otherwise} \end{cases}$$

2. Find the parameter "p" of a Geometric probability density function given the following Geometric sequence:

$$P(X=1) = 1/2$$
$$P(X=2) = 1/4$$
$$P(X=3) = 1/8$$
$$P(X=4) = 1/16$$

$$\sum_{i=0}^{\infty} (1/2)^i = 1$$

$$p\sum_{i=0}^{\infty} (1-p)^j = 1 \implies p = 1/2$$