Simulation Lab(MC503)

Assignment 10

Try to solve all the problems

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1. Generate 100 random sample from the Rayleigh distribution by considering its parameter value $\lambda = 1.5$ and $\mu = 1.2$

$$\text{PDF: } f(x) = 2\lambda(x-\mu)e^{-\lambda(x-\mu)^2}; x > \mu;\ \mu, \lambda > 0$$
$$\text{CDF: } F(x) = 1 - e^{-\lambda(x-\mu)^2}; x > \mu;\ \mu, \lambda > 0$$

   Apply Chi-square test to judge the goodness of fit. Also find the MLEs based on the generated sample data.

2. Consider a real dataset with observations listed as

.70	.84	.58	.50	.55	.82	.59	.71	.72	.61	.62	.49	.54	.36	.36	.71	.35
.64	.85	.55	.59	.29	.75	.46	.46	.60	.60	.36	.52	.68	.80	.55	.84	.34
.34	.70	.49	.56	.71	.61	.57	.73	.75	.44	.44	.81	.80	.87	.29	.50	

   Check the goodness-fit of given data set using Burr XII distribution and Burr X distribution by applying the Chi-square test. Also, find maximum likelihood estimates (MLEs) of unknown parameters c and k and also find their 95% asymptotic confidence intervals based on given realdata.

$$\textbf{Burr X: } F(x; c, k) = (1 - e^{-(cx)^2})^k; x > 0, c > 0, k > 0.$$
$$\textbf{Burr XII: } F(x; c, k) = 1 - (1 + x^c)^{-k}; x > 0; c, k > 0.$$