# Simulation Lab(MC503)
## Assignment 11

*Try to solve all the problems*

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1. Using probability integral transformation, generate the 1000 random samples from the Burr XII distribution by taking some suitable choice of parameters values.
Pdf and Cdf of Burr XII distribution is given by

$$f(x) = ck\frac{x^{c-1}}{(1+x^c)^{k+1}}; x > 0; c, k > 0$$
$$F(x) = 1 - (1+x^c)^{-k}; x > 0; c, k > 0$$

Apply Chi-square and KS test to judge the goodness of fit.

2. Generate 1000 random sample from the Rayleigh distribution by taking its parameter value $\lambda = 1.5$ and $\mu = 1.2$
Pdf and Cdf of Rayleigh distribution is given by

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

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

3. Generate 1000 random samples from the Kumarswamy distribution by taking some suitable choice of parameter and find their MLEs based on the generated data.
Pdf and Cdf of the Kumarswamy distribution is given as

$$f(x) = abx^{a-1}(1-x^a)^{b-1}; 0 < x < 1; a, b > 0$$
$$F(x) = 1 - (1-x^a)^b; 0 < x < 1; a, b > 0$$

4. Generate 50 random samples from the Weibull distribution by taking its some suitable choice of parameter as $\lambda = 2$ and $k = 1.5$.
Pdf and Cdf of the Weibull distribution is given as

$$f(x) = \frac{k}{\lambda}\Big(\frac{x}{\lambda}\Big)^{k-1}e^{-\left(\frac{x}{\lambda}\right)^k}; x \geq 0; \lambda, k > 0$$
$$F(x) = 1 - e^{-\left(\frac{x}{\lambda}\right)^k}; x \geq 0; \lambda, k > 0$$

Simulate the process upto 1000 times and find their average estimate of MLEs, average Bias and average MSE of the parameter.

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