# Assignment 5A

1. Random sample generation from Exponential Distributions:

   (a) $f(x) = (1/\sigma)\exp(-x/\sigma),\ x > 0, \sigma > 0.$

   (b) $f(x) = (1/\sigma)\exp(-(x-\mu)/\sigma),\ x > 0, \sigma > 0, \mu \in \mathbb{R}.$

   Apply Probability Integral Transform to generate 2000 sample from the above two distributions. You can take specific choices of parameters.

2. Random sample generation from Cauchy Distributions:

   (a) $f(x) = \frac{\sigma}{\pi(\sigma^2+x^2)},\ x \in \mathbb{R}, \sigma > 0.$

   (b) $f(x) = \frac{\sigma}{\pi(\sigma^2+(x-\mu)^2)},\ x, \mu \in \mathbb{R}, \sigma > 0.$

   Apply Probability Integral Transform to generate 2000 sample from the above two distributions. You can take specific choices of parameters.

3. $f(x) = \begin{cases} a + 2(1-a)x, & 0 \le x \le 1 \\ 0, & elsewhere. \end{cases}$ Generate 5000 sample from the above distribution using Probability Integral Transform method, if possible (taking specific value of the parameter). If not, use the following method:

   Generate $U_1, U_2, U_3 \sim U(0,1)$
   If $U_1 \le a, \{X = U_2\}$
   Else, $\{X = max(U_2, U_3)\}$