Summary

- To simulate random numbers from normal distribution, we use standard normal variate. Using given random numbers first we convert them into probabilities, which are taken cumulative probabilities. Hence, from probability we find corresponding value of standard normal variate Z using standard normal tables and then convert them into the real normal variate using the relation $X=\mu+Z\sigma$.
- While simulating the random numbers for an exponential distribution, in the beginning we convert given numbers into probabilities, which are taken as cumulative probabilities. Then by using cumulative distribution function, we solve for the random variable X.
  We know that for an exponential distribution with pdf $f(x)=\theta e^{-x\theta}$, $x>0$, cumulative probability function is given by, $F(X)=P(X<x)=1-e^{-x\theta}$. From this we solve for x.
- Suppose X is an exponential variate with pdf $f(x)=\frac{1}{\theta}e^{-x/\theta}, x>0$ the cumulative distribution function is given by, $F(X)=P(X<x)=1-e^{-x/\theta}$. From this we solve for x.
- While simulating random samples from Cauchy distribution, first we convert the given random numbers into probabilities. Then, by using cumulative distribution function, we solve for the random variable X. We know that for standard Cauchy Distribution with pdf $f(x)=1/[\pi(1+x^2)]$; $-\infty<x<\infty$, the cumulative distribution function is given by, $F(x) = P(X < x) = \frac{1}{\pi}\left[\tan^{-1} x + \frac{\pi}{2}\right]$ From this we get x