Lab Assignment - 3

Instructor: Dr. Arabin Kumar Dey

1 Due date:

- 1/3/2013.

2 Notes:

- Make a proper documentation preferably in latex or using some other software and submit the printout of the report in .pdf form.
- Each student needs to write his/ her own solutions, even though discussions of the assignments between students are encouraged.
- Use all codes in R.

3 Assignments:

1. Use the Box-Muller method and Marsaglia-Bray method to do the following :

   (a) Generate a sample of 100, 500 and 10000 values from $N(0, 1)$. Hence find the sample mean and variance.

   (b) Draw histogram in all cases.

2. Now use the above generated values to generated samples from $N(\mu = 0, \sigma^2 = 5)$ and $N(\mu = 5, \sigma^2 = 5)$. Hence plot the empirical(from sample with size 500) distribution function and theoretical distribution function in the same plot. (Use R/ you should also try making the step function in C).

3. Keep a track of the computational time required for both the methods. Which method is faster ?

4. For the Marsaglia-Bray method keep track of the proportional of values rejected. How does it compare with $1 - \frac{\pi}{4}$?