

# Lab Assignment - 2

**Instructor: Dr. Arabin Kumar Dey**

## **1 Due date:**

- 14/8/2017 midnight

## **2 Notes:**

- Submit all codes in R / S-plus corresponding to the questions.
- 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.

## **3 Assignments:**

Consider the daily stock return of the Citigroup (tick symbol C) and the Standard and Poor's 500 Composite index from January 2001 to December 2008. The data are simple returns and in the file d-csp0108.txt (three columns with date, C-rtn, SP-rtn).

- (a) Calculate the Kurtosis for both dataset. Make the interpretation of your result.

(b) Make qq-plot of returns of both companies with respect to normal distribution with mean as sample mean and variance as sample variance. Draw appropriate inference from the above qq-plot regarding distributional assumption of the data sets as normal and heavy tail nature of distribution of sample.

(c) Draw a random sample of size 20, 40, 100, 200 from Weibull(shape para=2, scale para=1).

(c1) Check whether there exists a unique maximum based on the above generated sample.

(d) Calculate maximum likelihood estimates and mean square error based on all samples. Use profile likelihood and newton raphson to calculate the mle. Also draw the profile likelihood of shape parameter. Take proper initial guess by making two dimensional surface plot.