Lab Assignment - 5

Instructor : Dr. Arabin Kumar Dey

1 Due date:

- 11/9/2017 midnight.

2 Notes:

- Submit the codes in all 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:

(a) Generate 100 sample (say $y_1, y_2, \cdots, y_n$ from N(0, 5)). Assume $y_1, y_2, \cdots, y_n|\sigma^2 \sim N(0, \sigma^2)$ where σ^2 is unknown and also assume a prior on σ^2 as $p(\sigma^2) \propto (\sigma^2)^{-\frac{5}{2}-1} e^{-\frac{1}{2\sigma^2}}$. Find out 95% credible interval for σ^2 based on above sample.

(b) Consider the daily stock return of the Citigroup (tick symbol C) and the Standard and Poors 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).

(i) Transform the simple return into log-return. Assume the data follows normal. Calculate 95% confidence interval for mean of log-return when variance is unknown. Use the confidence interval to check whether mean is zero or not. Perform the confidence interval based on first 50 samples and then with full sample.

(i) Perform 95% bootstrap confidence interval (both boot- t / boot percentile) to check that mean of the log-returns is zero. Perform the confidence interval based on first 50 samples and then with full sample.