

1. For problem Ch3:19, you may use software R which can be downloaded at <http://www.r-project.org/>. The R code given in the lecture notes may be helpful.
2. For problem Ch5:1, the definition for S_n^2 is

$$S_n^2 = \frac{1}{n-1} \sum_{i=1}^n (X_i - \bar{X}_n)^2$$

where $\bar{X}_n = \frac{1}{n} \sum_{i=1}^n X_i$. There is a typo for the "Hint" in the file posted on the course website. The hint should be: Show that $S_n^2 = c_n n^{-1} \sum_{i=1}^n X_i^2 - d_n (\bar{X}_n)^2$ where $c_n \rightarrow 1$ and $d_n \rightarrow 1$. Theorem 5.5 is useful for the second part of this problem. The statement for parts (a), (d) and (f) of Theorem 5.5 is: Let X_n, X, Y_n, Y be random variables. Let g be a continuous function. Then

- (a) : If $X_n \xrightarrow{P} X$ and $Y_n \xrightarrow{P} Y$, then $X_n + Y_n \xrightarrow{P} X + Y$
- (d) : If $X_n \xrightarrow{P} X$ and $Y_n \xrightarrow{P} Y$, then $X_n Y_n \xrightarrow{P} XY$
- (f) : If $X_n \xrightarrow{P} X$, then $g(X_n) \rightarrow g(X)$.