Assignments #12 of
Econometrics I & Advanced Econometrics I (2013SY)

July 17, 2013

Instruction to students

It is not necessary to submit. However, solving this question is highly recommended.

Q

Let $\{S_n\}$ be a random sequence and follows $Bin(n, p)$. Answer following questions.

(1) Show that $\dfrac{S_n}{n}$ converges in probability to p, i.e. $\dfrac{S_n}{n} \xrightarrow{P} p$ by use of characteristic functions. (Hint: Use Taylor expansion of $e^{i\theta}$)

(2) Show that standardized S_n/n converges in distribution to the standard normal distribution, i.e.
$$\frac{\sqrt{n}\left(\frac{S_n}{n} - p\right)}{\sqrt{p(1-p)}} \xrightarrow{d} N(0, 1),$$
by use of characteristic functions.