

INTRODUCTION to ECONOMETRICS

Home-work I 2020

Deadline. September 13 11h59pm [Paris time] via email in PDF format and first class after the deadline for the printed version of your work again. Delays will be penalized.

Instructions. I am expecting one PDF file for each student named LAST_NAME.pdf containing the description of the code, the results obtained and their interpretations. This document should be formatted according to the template available on the course web-page. Not respecting the formatting will affect your grade.

Problem 1 [LLN]

Let X be a random variable representing the roll of a 'fair' dice.

Write the R code to show the Law of Large Numbers in action. Build a Monte Carlo experiment in which you set the sample size n equal to 2, 25, 100 and 1000 and

1. show that the range of variation of the sample average \bar{X} shrinks;
2. represent graphically the four cases as in slide 18 in my Class 1 presentation.

Problem 2 [CLT].

Let X be a Normally distributed random variable with mean $\mu_X = -10$ and variance $\sigma_X^2 = 1$.

Write the R code to show the Central Limit Theorem in action. Build a Monte Carlo experiment in which you set the sample size n equal to 2, 25, 100 and 1000 and

1. show that the distribution of $\frac{X - \mu_X}{\sqrt{\frac{\sigma_X^2}{n}}}$ converges to a standardized Normal distribution, that is to a Normal distribution with mean and variance equal to 0 and 1 respectively.
2. represent graphically the four cases as in slide 23 in my Class 1 presentation.