

## Practical works: SLLN & CLT

### Practice #1:

1. Generate a vector  $x$  of 100 random numbers according to Bernoulli distribution of parameter  $p = \frac{1}{2}$ .
  - i. Plot the series  $\{\bar{x}_k : k = 1, \dots, 100\}$

$$\bar{x}_k = \frac{1}{k} \sum_{i=1}^k x_i.$$

2. Do the same for  $p = \frac{1}{3}$  and make the plot on the same graph as before.
3. Comment.

### Practice #2:

1. Generate a  $100 \times 100$  matrix  $M$  of random numbers according to the uniform distribution  $\mathcal{U}[0, 1]$ .
2. Choose one single column  $x_i$  of the matrix  $M$  and consider its normalization  $\tilde{x}_i = \frac{x_i - \bar{x}_i}{\sigma_i}$ , and plot its histogram.
3. Build the series of averages of all columns  $\bar{x}_a$  and plot its histogram.
4. Comment.

### Practice #3:

Reconsider Exercises #5 and #6 of Exercises sheet about convergence of random variables, by using the statistical package "R".