732A90: Computational Statistics

Computer lab3 - Group11

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Question 1: Cluster sampling

1.

2.

Question 2: Different distributions

1.

The double exponential (Laplace) distribution is given by formula:

$$DE(\mu, \alpha) = \frac{\alpha}{2} exp(-\alpha|x - \mu|)$$

Let,

$$X \sim DE(0, 1)$$

Then,

$$f_x(x) = \frac{1}{2} exp(-|x|)$$

Also,

$$F_x(x) = \int_{-\infty}^{x} f_x(s)ds = \frac{1}{2} exp(-|s|)ds$$

Therefore,

$$F_x(x) = \begin{cases} \frac{exp(x)}{2}, x < 0 \\ 1 - \frac{exp(-x)}{2}, x \geq 0 \end{cases}$$

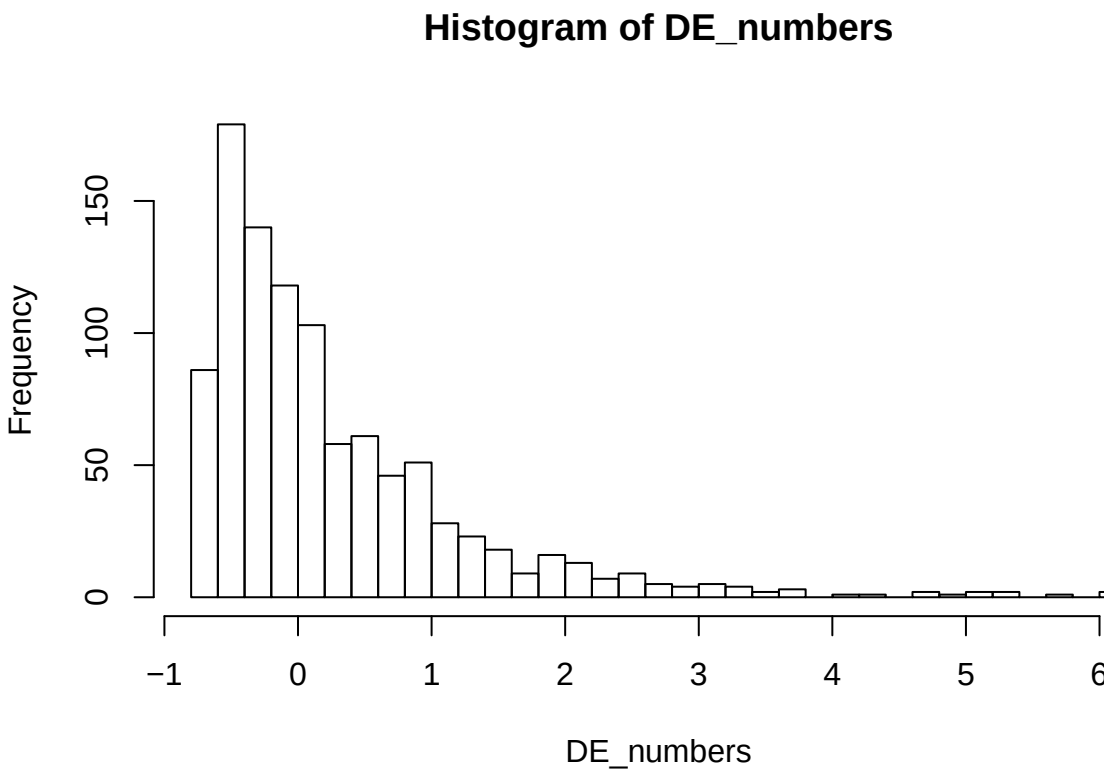
!!!QUESTION: Here I only use the function for x>0. Should we do it for bigger and smaller than 0????? !!!!

Using the CDF method we look for F_x^{-1}, which is:

$$F_x^{-1}(y) = -ln(2 - 2y)$$

Hence, if $U \sim U(0, 1)$, then

$$-ln(2 - 2U) = X \sim DE(0, 1)$$



Using this formula bla bla. . .

The histogram looks like an exponential???

2.