

Random Numbers

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Outline

1 Problem Statement

2 Solution

Problem Statement

(1.3)

Find the theoretical expression for $F_U(x) = \Pr(U \leq x)$, where U is the uniform random variable between 0 and 1.

Solution

U is given by

$$U(x) = \begin{cases} 0, & x \in (-\infty, 0) \\ 1, & x \in (0, 1) \\ 0, & x \in (1, \infty) \end{cases} \quad (1)$$

Solution

Therefore, we have:

$$F_U(x) = \int_0^x U(x) dx \quad (2)$$

Computing the integral, we get:

$$F_U(x) = \begin{cases} 0, & x \in (-\infty, 0) \\ x, & x \in (0, 1) \\ 1, & x \in (1, \infty) \end{cases} \quad (3)$$