Assignment-3

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Contents

1 From Uniform to Other

1.1 Generate samples of

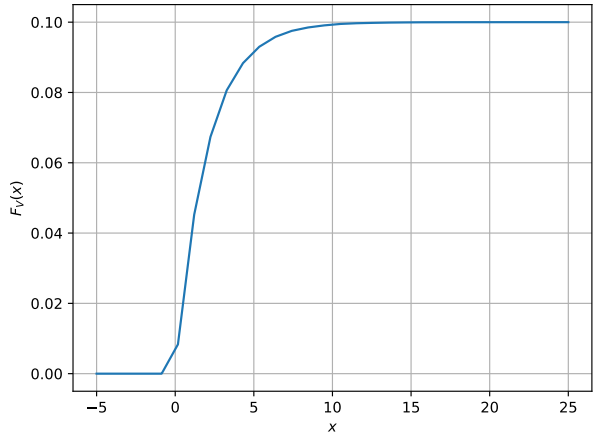
$$V = -2\ln(1-U) \tag{1.1.1}$$

and plot its CDF.

Solution: The following code are

https://github.com/ee22mtech11017/assingment/blob/main/assign3.c

https://github.com/ee22mtech11017/assingment/blob/main/cdf_plot.py



The CDF of X

1.2 Find a theoretical expression for $F_V(x)$.

Solution:

$F_V(x) = \Pr(V \le x)$

$F_V(x) = \Pr(-2\ln(1-U) \le x)$

$F_V(x) = \Pr\left(ln(1-U) \ge \frac{x}{-2}\right)$

$F_V(x) = \Pr\left(1-U \ge \exp\frac{x}{-2}\right)$

$F_V(x) = \Pr\left(U \le 1 - exp\frac{-x}{2}\right)$

$F_V(x) = 1 - \Pr\left(U \le exp\frac{-x}{2}\right)$

$$F_V(x) = 1 - \int_{-\infty}^{exp\frac{-x}{2}} f_X(x)\,dx$$

$$F_V(x) = 1 - \int_{0}^{exp\frac{-x}{2}} 1\,dx$$

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