HOMEWORK - 02

Basics of Simulation Modeling

# Uniform Random Variates – U(a,b)

To generate uniform random variates, following equation is used:

u = F(x) 0 <= u <= 1

x = F-1(u)

x = a + (b-a)u

LCGRAND Seed = 1

Variates Generated = 1000

Min. Limit (a) = 4

Max. Limit (b) = 10

# Plots

The Uniform Distribution range of [4,10] is divided into 6 buckets and mid-point of each bucket is taken as reference in further plots.

Chart, histogram

Description automatically generated

Figure ‑: Histogram showing number of random variates in each bucket

The Probability Density Function (PDF) and Cumulative Density Function (CDF) are shown in Figure 2-2 and 2-3 respectively. The Initial PDF and CDF start at same value and as the distribution is uniform, the pdf is almost same and the cdf increases linearly until it reaches 1. This can be seen clearly in Figure 2-4, where CDF and PDF are in a single plot.

Chart, line chart

Description automatically generated

Figure ‑: Line Graph showing probability density function of each bucket

Chart, line chart

Description automatically generated

Figure ‑: Line Graph showing cumulative probability density of buckets

Chart, line chart

Description automatically generated

Figure ‑: PDF and CDF Comparison

Figure 2-5 shows CDF and PDF of generated random variates along with Ideal CDF & PDF. The calculated PDF is almost same as Ideal PDF and fluctuates above and below Ideal due to randomness.

Chart, line chart

Description automatically generated

Figure ‑: Calculated PDF & CDF vs Ideal PDF & CDF

PLAGIARISM STATEMENT

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