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University of Massachusetts Lowell
Department of Electrical and Computer Engineering
16.5200 Computer Aided Engineering Analysis

1. Generate a sequence of $N = 10000$ random numbers drawn from a uniform distribution. Each random number x should have a value between 0 and 1. Use the intrinsic function such as rand() in fortran 95 or random() in C.

   a. Construct a histogram of the random sequence variables. Provide the count of the number of values of x that fall in each interval $BIN_WIDTH = 1/MBIN$ where $MBIN = 10$. Use gnuplot to graphically render your result.

   b. Evaluate the mass function and probability density using the count distribution. Plot the result.

2. In this problem we wish to evaluate the integral of the function $f(x) = x$ using the Monte Carlo approach.

$$ANSWER = \int_0^1 f(x)dx$$

   a. Generate uniform random variables x and y that range over the interval between 0 to 1. Count the number of cases where $y < f(x)$.

   b. Explain how and way this result can be used to compute the area.

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$j = \text{int}\left[x/dx\right]$