Graph for part (3) : Central Limit Theorem

A close up of a map

Description generated with high confidence

Graph for part (5) : Histogram of Distribution of 1000 Random Variables

A close up of a sign

Description generated with high confidence

6. CODES :

Part (2):

% Part (2) : Genrate uniform random variables in [0,1] and find it's mean

% and variance.

i = input('Enter the number of random numbers between 0 and 1: ')

X = rand(i,1);

% Find the mean and variance of the generated numbers

stats = [mean(X) std(X) var(X)]

% Expected value of mean and variance

exp\_mean = (0+1)/2;

exp\_var = (1-0)^2/12;

% Estimate of variance of sample mean

var\_est = var(X)/i;

Part (3):

% Part (3) : Genrate N=100 uniform random variables in [0,1] 50 times to

% get a set of sample means. Compare it to a normal curve.

N = 100;

no\_trials = 50;

% Generate the 50 means

for m = 1:no\_trials

X = rand(N,1);

Mean\_trials(m) = mean(X);

end

% Fit Normal Distribution

histfit(Mean\_trials)

Part (4):

% Part (4) : Genrate uniform random variables in [0,1] and find it's

% co-variance relation.

i = input('Enter the number of random numbers between 0 and 1: ')

X = rand(i+1,1);

% The different summations used in the value

sum1 = 0;

for m = 1:i

sum1 = sum1 + X(m)\*X(m+1);

end

sum2 = 0;

for m = 1:i

sum2 = sum2 + X(m);

end

sum3 = 0;

for m = 2:i+1

sum3 = sum3 + X(m);

end

% The value of z

z = ((sum1)/i) - ((sum2\*sum3)/(i^2))

Part (5):

% Part (5) : Bonus Points

i = input('Enter the number of random numbers between 0 and 1: ')

X = rand(i,1);

% Generation of histogram

[N, edges]= histcounts(X,10);

bar(0:1:9,N)

xlim([0 9])

xlabel('Intervals')

ylabel('Random numbers')

hold on

A(1:1, 1:10)=i/10;

plot(0:1:9,A,'green')

xlim([0 9])