



Mathematical Modelling & Simulation (MC-409) Lab

Experiment 9 - Write a program for Monte Carlo method using MATLAB

Delhi Technological University

Dr. Vineet Srivastava

6th November 2020

Anish Sachdeva
DTU/2K16/MC/013

Code

```
% Monte Carlo Methods
```

```
clc;
```

```
clear;
```

```
close all;
```

```
n=50;
```

```
x=rand(n,1); gav=zeros(n,3); gavvar=NaN(n,3); gav(1,1)=x(1,1);
```

```
gav(1,2)=x(1,1)^2;
```

```
gav(1,3)=cos(pi*x(1,1));
```

```
for i=2:n
```

```
    gav(i,1)=sum(x(1:i))/i; gav(i,2)=sum(x(1:i).^2)/i; gav(i,3)=sum(cos(pi*x(1:i)))/i;
    gavvar(i,1)=var(x(1:i));
```

```
    gavvar(i,2)=var(x(1:i).^2);
```

```
    gavvar(i,3)=var(cos(pi*x(1:i)));
```

```
end
```

```
% Visualization figure(1);
```

```
subplot(3,1,1);
```

```
plot(gav(:,1)); line((1:n),ones(n,1)/2,'color','red');
```

```
legend('Empirical Average','Theoretical Mean','Location','NorthEastOutside');
```

```
title('f(x)=x');
```

```
subplot(3,1,2);
```

```
plot(gav(:,2)); line((1:n),ones(n,1)/3,'color','red');
```

```
legend('Empirical Average','Theoretical Mean','Location','NorthEastOutside'); title('f(x)=x^2');
```

```
subplot(3,1,3);
```

```
plot(gav(:,3)); line((1:n),ones(n,1)*0,'color','red');
```

```
legend('Empirical Average','Theoretical Mean','Location','NorthEastOutside');
```

```
title('f(x)=cos(\pi x)');
```

Output

