MA202 ASSIGNMENT 9

NAME:

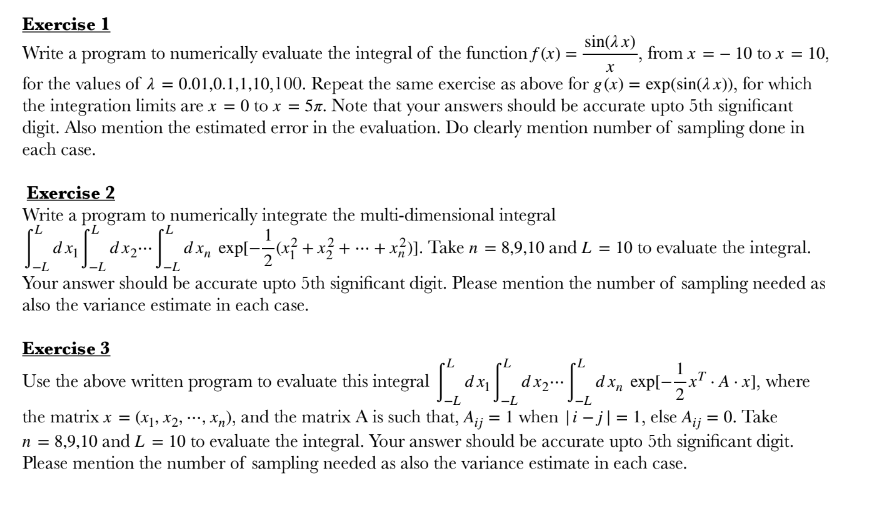
ARCHIT AGRAWAL

ROLL NO. :

202051213

SECTION:

2



**Exercise 1(a)**

***Code***

The values of c is changed repeatedly.

%%Monte Carlo Height implementation

%lower Limit

a = -10;

%upper limit

b = 10;

%total tries

N = 1000;

%c values

c = 0.01

%c = 0.1

%c = 1

%c = 10

%c = 100

%defining the function

f = @(x) sin(c\*x)./(x);

for i = 1: N

x\_val(i) = rand(1)\*(b-a)+a;

y\_val(i) = (b-a)\*f(x\_val(i));

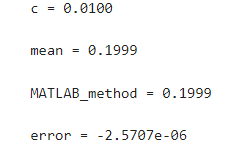
end

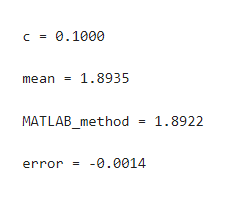
mean = sum(y\_val)/N

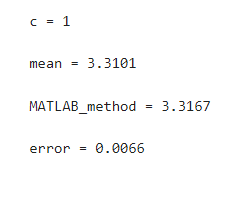
MATLAB\_method = integral(f,a,b)

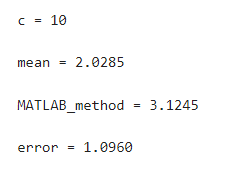
error = MATLAB\_method - mean

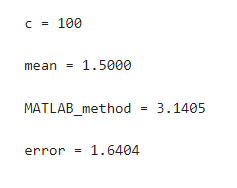
***Output***

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**Exercise 1(b)**

***Code***

%%Monte Carlo Height implementation

%lower Limit

a = 0;

%upper limit

b = 5\*pi;

%total tries

N = 1000;

%c values

%c = 0.01

%c = 0.1

%c = 1

%c = 10

%c = 100

%defining the function

f = @(x) exp(sin(c\*x));

for i = 1: N

x\_val(i) = rand(1)\*(b-a)+a;

y\_val(i) = (b-a)\*f(x\_val(i));

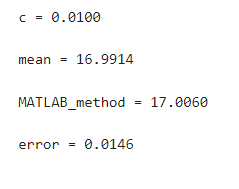
end

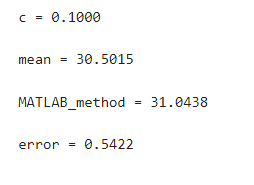
mean = sum(y\_val)/N

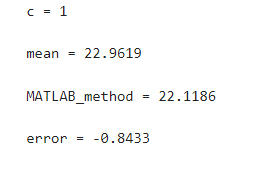
MATLAB\_method = integral(f,a,b)

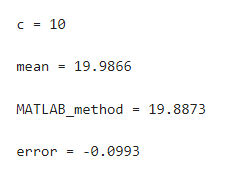
error = MATLAB\_method - mean

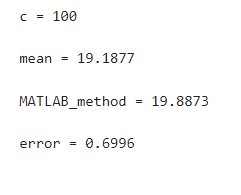
***Output***

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**Exercise 2**

***Code***

%%Monte Carlo Height implementation

%lower Limit of x1

ax1 = -10;

%upper limit of x1

bx1 = 10;

%lower Limit of x2

ax2 = -10;

%upper limit of x2

bx2 = 10;

%lower Limit of x3

ax3 = -10;

%upper limit of x3

bx3 = 10;

%lower Limit of x4

ax4 = -10;

%upper limit of x4

bx4 = 10;

%lower Limit of x5

ax5 = -10;

%upper limit of x5

bx5 = 10;

%lower Limit of x6

ax6 = -10;

%upper limit of x6

bx6 = 10;

%lower Limit of x7

ax7 = -10;

%upper limit of x7

bx7 = 10;

%lower Limit of x8

ax8 = -10;

%upper limit of x8

bx8 = 10;

%lower Limit of x9

ax9 = -10;

%upper limit of x9

bx9 = 10;

%lower Limit of x9

ax10 = -10;

%upper limit of x9

bx10 = 10;

%total tries

N = 1000;

%defining the function

f = @(x1,x2,x3,x4,x5,x6,x7,x8,x9,x10) exp(-0.5\*(x1.^2 + x2.^2+x3.^2+x4.^2 +x5.^2 +x6.^2 +x7.^2 +x8.^2+x9.^2+x10.^2));

for i = 1: N

x1\_val(i) = rand(1)\*(bx1-ax1)+ax1;

x2\_val(i) = rand(1)\*(bx2-ax2)+ax2;

x3\_val(i) = rand(1)\*(bx3-ax3)+ax3;

x4\_val(i) = rand(1)\*(bx4-ax4)+ax4;

x5\_val(i) = rand(1)\*(bx5-ax5)+ax5;

x6\_val(i) = rand(1)\*(bx6-ax6)+ax6;

x7\_val(i) = rand(1)\*(bx7-ax7)+ax7;

x8\_val(i) = rand(1)\*(bx8-ax8)+ax8;

x9\_val(i) = rand(1)\*(bx9-ax9)+ax9;

x10\_val(i) = rand(1)\*(bx10-ax10)+ax10;

plane(i)= f(x1\_val(i),x2\_val(i),x3\_val(i),x4\_val(i),x5\_val(i),x6\_val(i),x7\_val(i),x8\_val(i),x9\_val(i),x10\_val(i));

end

mean = (20^10)\*sum(plane)/N;

mean

***Output***

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**Exercise 3**

***Code***

clc;

clear all;

lower\_limit = -10;

upper\_limit = 10;

% For n = 8

for i = 1:8

for j = 1:8

if abs(i-j) == 1

A(i,j) = 1;

else

A(i,j) = 0;

end

end

end

sum = 0;

for i = 1 : 10000

x(:,i) = lower\_limit + (upper\_limit - lower\_limit)\*rand(1,8);

sum = sum + exp((-0.5\*transpose(x(:,i))\*A\*x(:,i)));

end

sum = sum/10000;

sum = sum\*(upper\_limit - lower\_limit).^8

clc;

clear all;

lower\_limit = -10;

upper\_limit = 10;

% For n = 9

for i = 1:9

for j = 1:9

if abs(i-j) == 1

A(i,j) = 1;

else

A(i,j) = 0;

end

end

end

sum = 1;

for i = 1 : 10000

x(:,i) = lower\_limit + (upper\_limit - lower\_limit)\*rand(1,9);

sum = sum + exp((-0.5\*transpose(x(:,i))\*A\*x(:,i)));

end

sum = sum/10000;

sum = sum+(upper\_limit - lower\_limit).^9

clc;

clear all;

lower\_limit = -10;

upper\_limit = 10;

% For n = 10

for i = 1:10

for j = 1:10

if abs(i-j) == 1

A(i,j) = 1;

else

A(i,j) = 0;

end

end

end

sum = 0;

for i = 1 : 10000

x(:,i) = lower\_limit + (upper\_limit - lower\_limit)\*rand(1,10);

sum = sum + exp((-0.5\*transpose(x(:,i))\*A\*x(:,i)));

end

sum = sum/10000;

sum = sum\*(upper\_limit - lower\_limit).^10

***Output***

