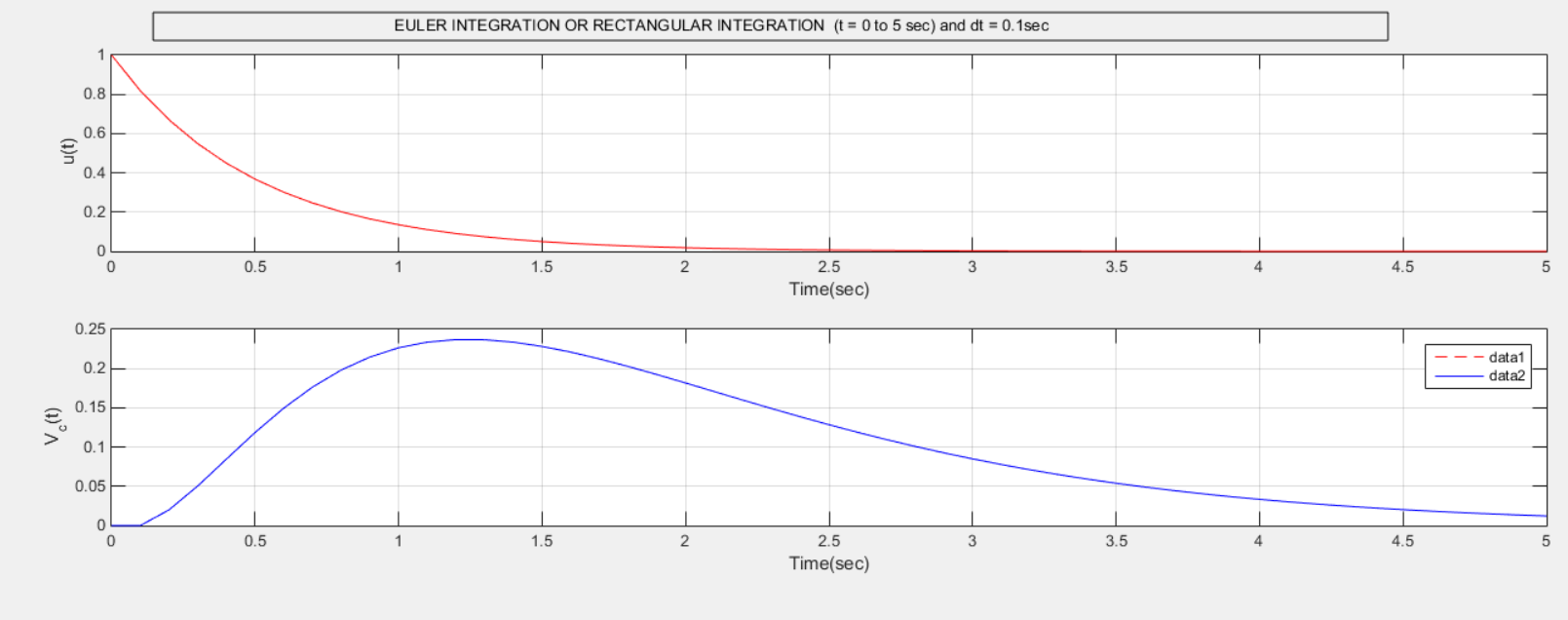
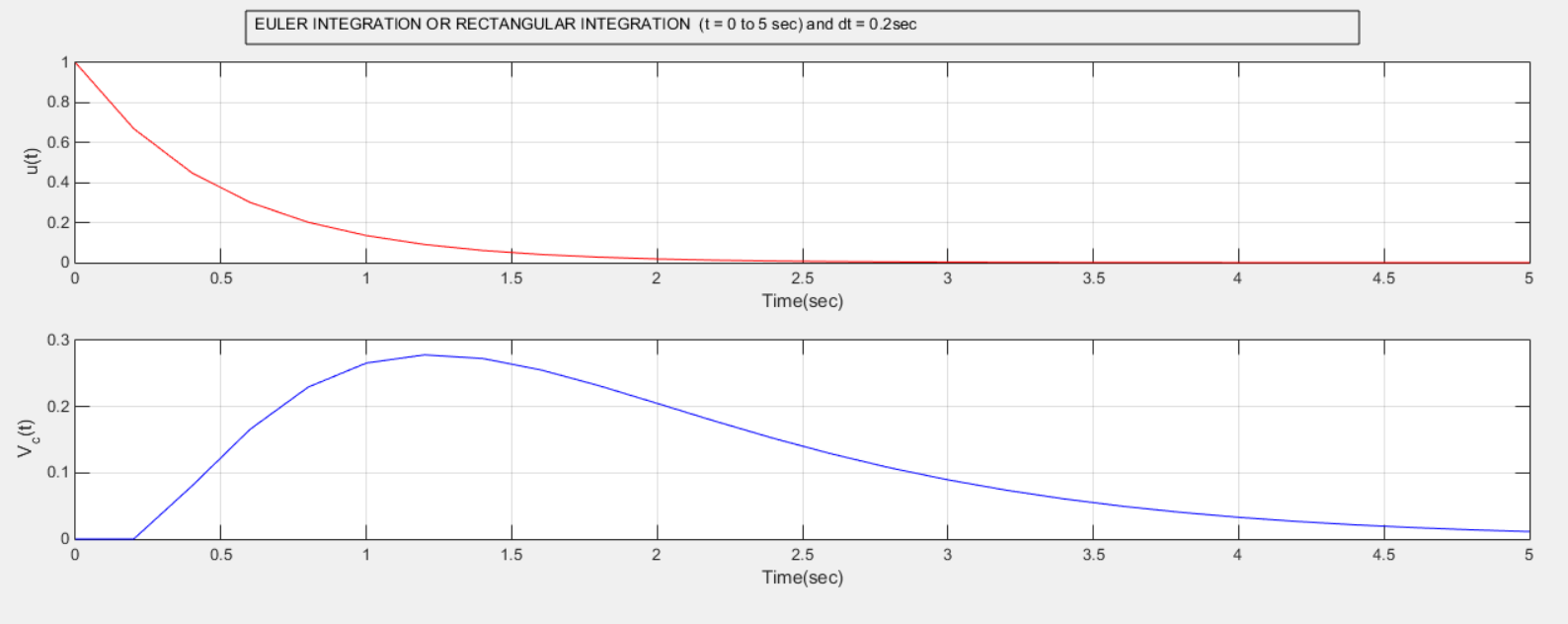
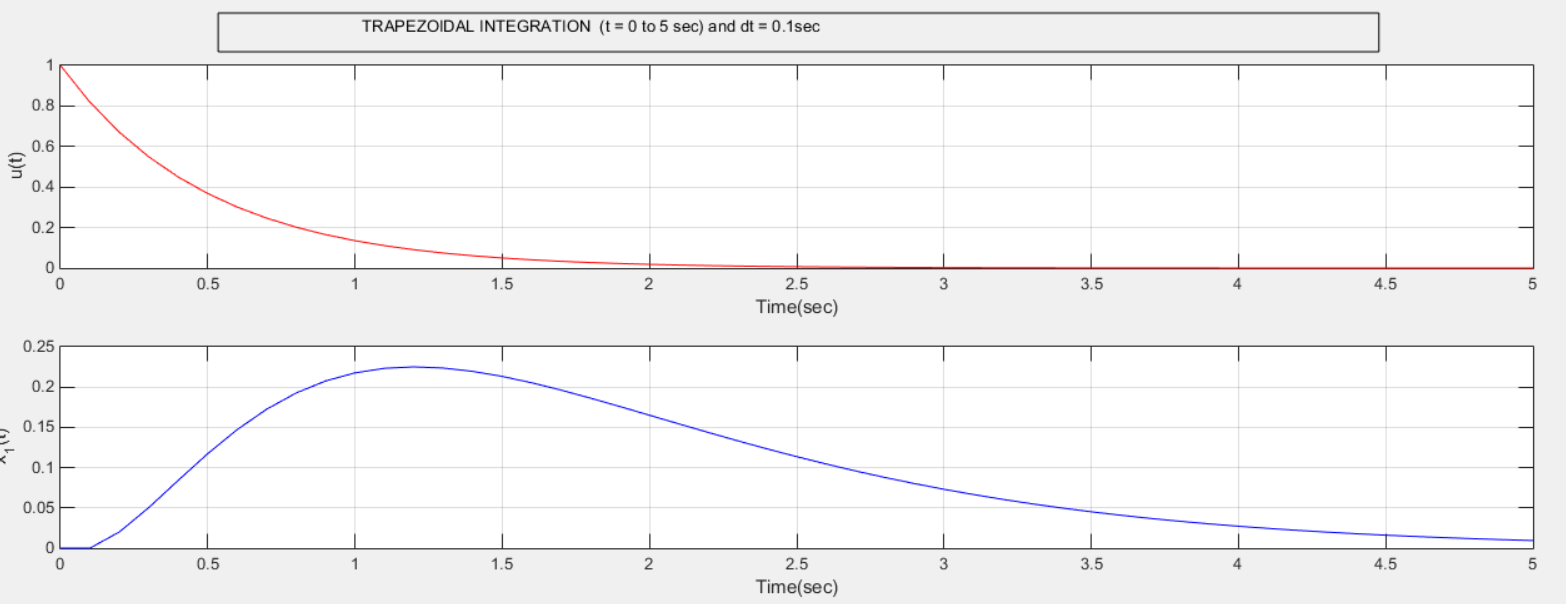
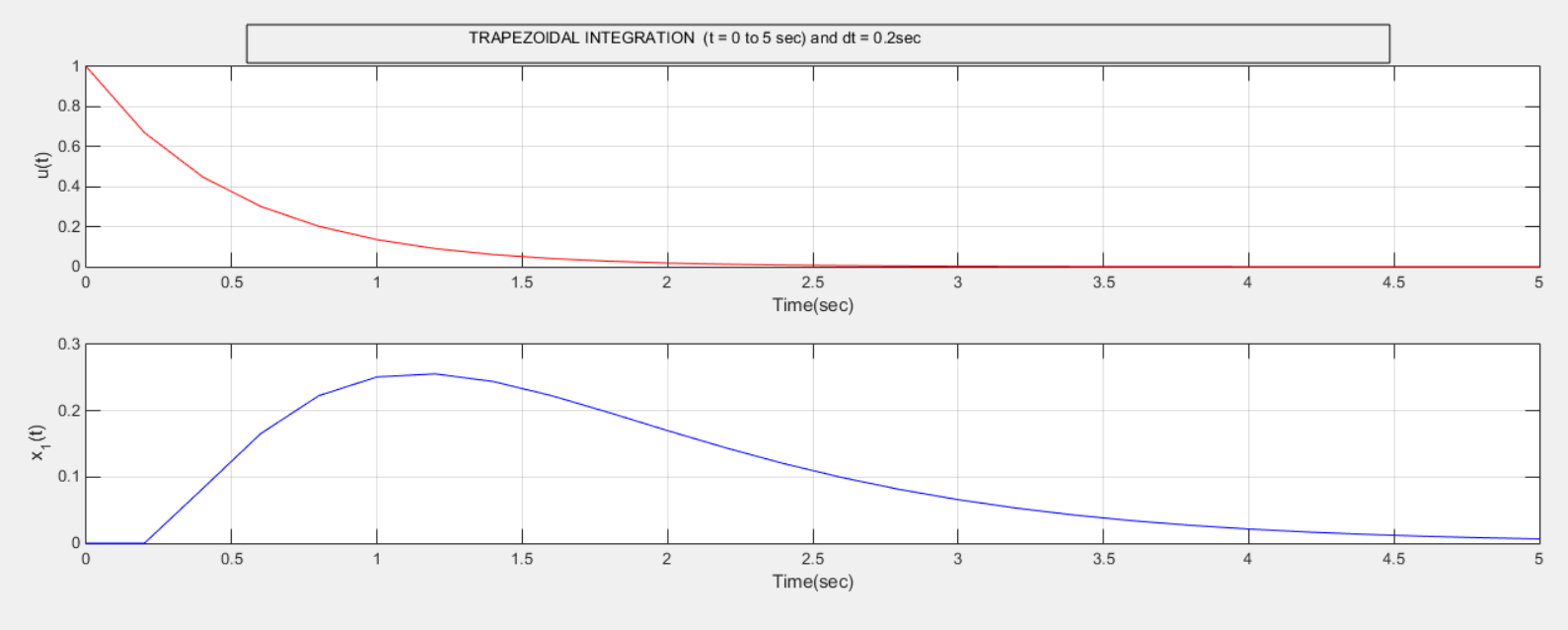
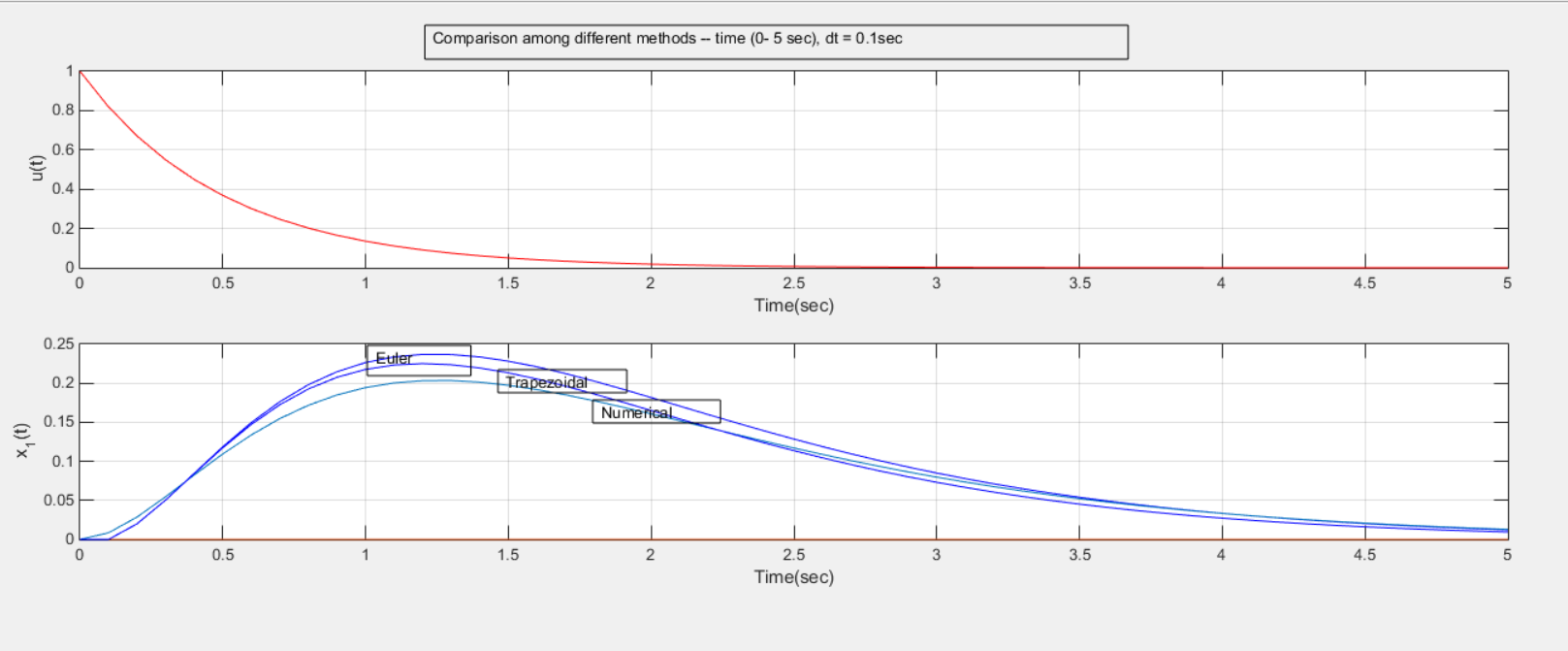
Question 3:

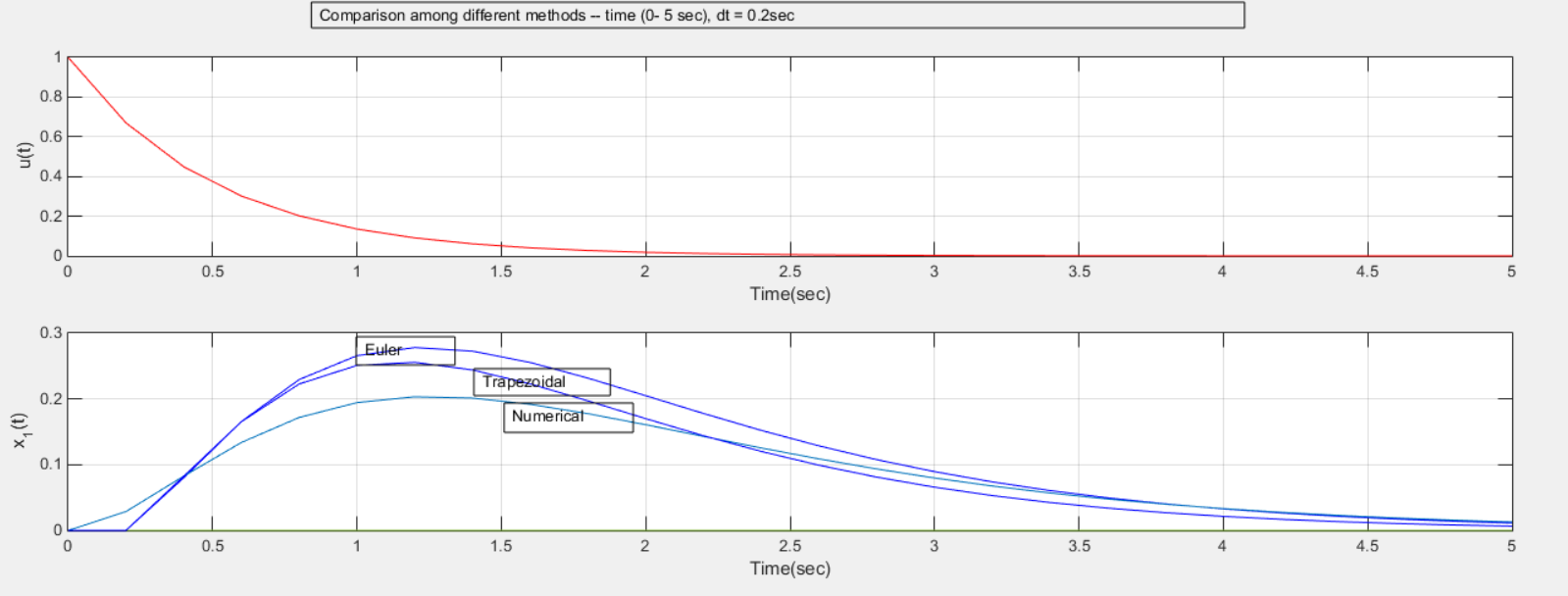












CODE:

EULER :  
% to do euler integration or rectangular integration

C = 0.5;

L = 1;

R = 3;

dt = 0.2;

t = [0:dt:5]';

drl = length(t);

A = [0 1/C;-1/L -R/L];

x = zeros(2,drl);

D = [0;1/L];

u = exp(-2\*t);

dt\_1 = 1;

t\_1 = [0:dt\_1:5]';

drl\_1 = length(t\_1);

G = A\*dt;

F = D\*dt;

for k= 2:drl

x(:,k) = x(:,k-1)+G\*x(:,k-1)+F\*u(k-1);

end

for k= 1:drl\_1-1

x(1,(k\*5))

end

figure(gcf)

subplot(311)

plot(t,u,'r-');grid on

ylabel('u(t)')

xlabel('Time(sec)')

subplot(312)

plot(t,x(1,:),'r--');grid on;hold on;

plot(t,x(1,:),'b-');

ylabel('V\_c(t)')

xlabel('Time(sec)')

TRAPEZOIDAL:

% to do trapezoidal integration

C = 0.5;

L = 1;

R = 3;

dt = 0.2;

t = [0:dt:5]';

drl = length(t);

A = [0 1/C;-1/L -R/L];

x = zeros(2,drl);

del\_x = zeros(2,drl);

del\_x2 = zeros(2,drl);

D = [0;1/L];

u = exp(-2\*t);

dt\_1 = 1;

t\_1 = [0:dt\_1:5]';

drl\_1 = length(t\_1);

for k= 2:drl

del\_x(:,k) = A\*x(:,k-1)\*dt+D\*u(k-1)\*dt;

del\_x2(:,k)= (A\*x(:,k-1)+del\_x(:,k))\*dt+D\*u(k)\*dt;

x(:,k) = x(:,k-1)+((del\_x(:,k)+del\_x2(:,k))/2);

end

for k= 1:drl\_1-1

x(1,(k\*5))

end

figure(gcf)

subplot(311)

plot(t,u,'r-');grid on

ylabel('u(t)')

xlabel('Time(sec)')

subplot(312)

plot(t,x(1,:),'r--');grid on;hold on;

plot(t,x(1,:),'b-');

ylabel('x\_1(t)')

xlabel('Time(sec)')

% to do analytical model

dt = 0.2;

t = [0:dt:5]';

drl = length(t);

x = zeros(drl);

dt\_1 = 1;

t\_1 = [0:dt\_1:5]';

drl\_1 = length(t\_1);

for k= 2:drl

x(k) = -2\*t(k)\*exp(-2\*t(k))-2\*exp(-2\*t(k))+2\*exp(-t(k));

end

for k= 1:drl\_1-1

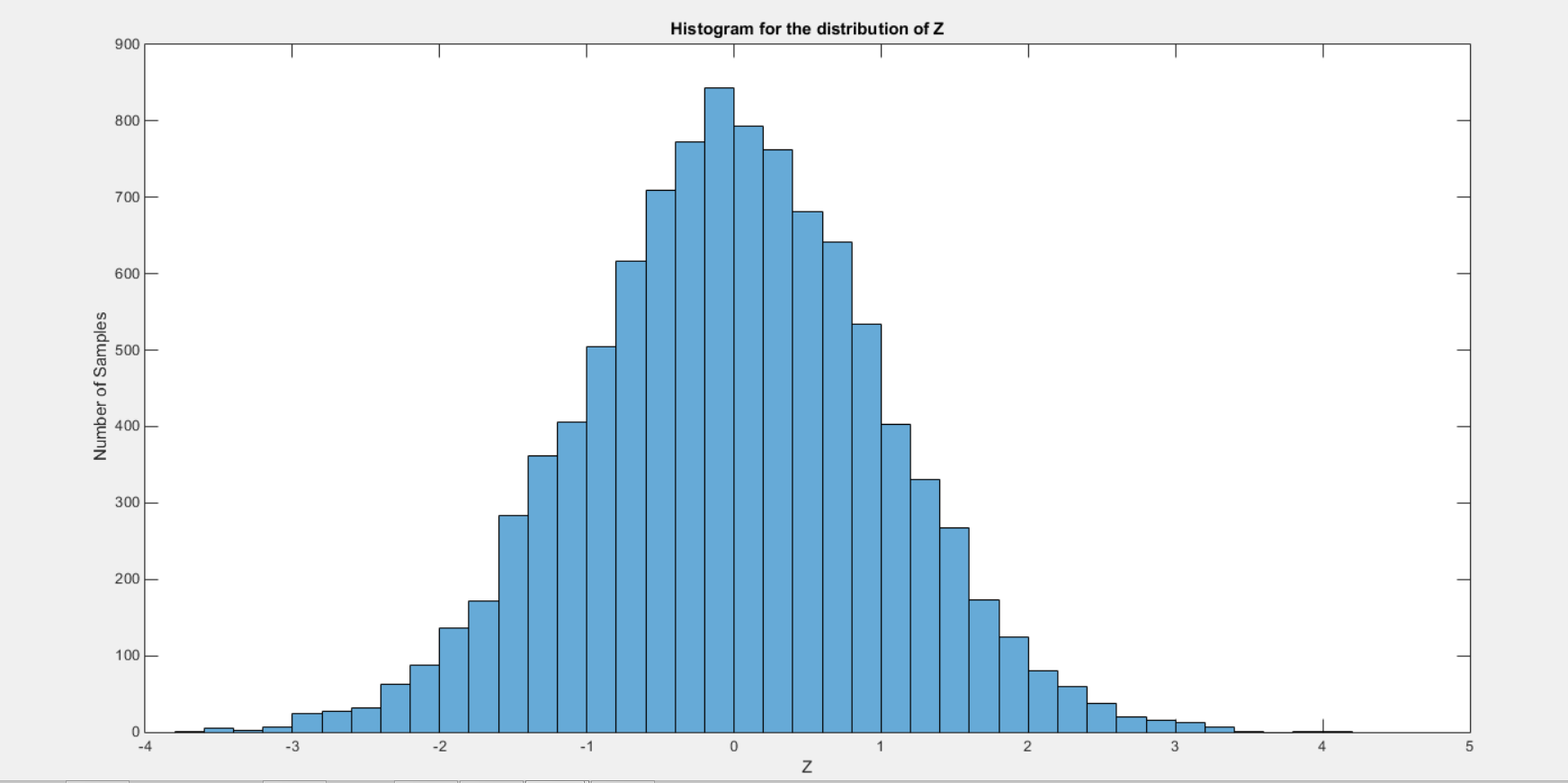
x(k\*5)

end

plot(t,x)

HISTOGRAM:

Question 6:



CODE:

X = rand(10000,1);

Y = rand(10000,1);

Z = zeros(10000,1);

for i=1:10000

Z(i,1) = sqrt(-2\*log(X(i,1)))\*cos(2\*pi\*Y(i,1));

end

histogram(Z)