Q3 (Using Gauss-Elimination)

clear all

clc

a=[10 8 -3 1 16;2 10 1 -4 9;3 -4 10 1 10;2 2 -3 10 11];

%m=[0 0 0 0 0;0 0 0 0 0;0 0 0 0 0;0 0 0 0 0];

n=4;

m=zeros(n,n+1);

for i=1:1:n-1

for j=i+1:1:n

m(j,i)=a(j,i)/a(i,i);

a(j,:)=a(j,:)-(m(j,i)\*a(i,:));

if(a(n,n)==0)

disp("No unique solution");

break;

end

end

end

disp(a);

x=zeros(n,1);

%x=zeros(n);

x(n)=a(n,n+1)/a(n,n);

for i=n-1:-1:1

sum=0;

for j=i+1:n

sum=sum+a(i,j)\*x(j);

end

x(i)=(a(i,n+1)-sum)/a(i,i);

end

disp("x y z u =");

disp(x);

%Ans x=1,y=1,z=1 and u=1.

Q3 (Using LU Decompsition)

clear all

clc

t=[10 8 -3 1;2 10 1 -4;3 -4 10 1;2 2 -3 10];

b=[16;9;10;11];

%m=[0 0 0 0 0;0 0 0 0 0;0 0 0 0 0;0 0 0 0 0];

a=[t,b]

n=4;

m=zeros(n,n+1);

for i=1:1:n-1

for j=i+1:1:n

m(j,i)=a(j,i)/a(i,i);

a(j,:)=a(j,:)-(m(j,i)\*a(i,:));

if(a(n,n)==0)

disp("No unique solution");

break;

end

end

end

disp(a);

x=zeros(n,1);

%x=zeros(n);

x(n)=a(n,n+1)/a(n,n);

for i=n-1:-1:1

sum=0;

for j=i+1:n

sum=sum+a(i,j)\*x(j);

end

x(i)=(a(i,n+1)-sum)/a(i,i);

end

disp("x1 x2 x3 x4 =");

disp(x);

% l=m;

% %disp(l);

u=a;

l=zeros(n,n+1);

for i=1:1:n

for j=1:1:n

if(j>i)

l(j,i)=m(j,i);

end

l(i,i)=1;

end

end

disp(l);

l=l(1:n,1:n);

disp(l);

u=u(1:n,1:n);

disp(u);

Y=inv(l)\*b;

X=inv(u)\*Y;

disp("solution to the equations are==>")

disp(X);

%Ans x=1,y=1,z=1 and u=1.

Q4

clear all

clc

a=[pi sqrt(2) -1 1 0;exp(1) -1 1 2 1;1 1 -sqrt(3) 1 2;-1 -1 1 -sqrt(5) 3];

%m=[0 0 0 0 0;0 0 0 0 0;0 0 0 0 0;0 0 0 0 0];

n=4;

m=zeros(n,n+1);

for i=1:1:n-1

for j=i+1:1:n

m(j,i)=a(j,i)/a(i,i);

a(j,:)=a(j,:)-(m(j,i)\*a(i,:));

if(a(n,n)==0)

disp("No unique solution");

break;

end

end

end

disp(a);

x=zeros(n,1);

%x=zeros(n);

x(n)=a(n,n+1)/a(n,n);

for i=n-1:-1:1

sum=0;

for j=i+1:n

sum=sum+a(i,j)\*x(j);

end

x(i)=(a(i,n+1)-sum)/a(i,i);

end

disp("x1 x2 x3 x4 =");

disp(x);

% Answer:

%x1 x2 x3 x4 =

% 1.3494

% -4.6780

% -4.0329

% -1.6566

Q5

clear all

clc

t=[5 5 0 0 0;0 0 1 -1 -1;0 0 0 2 -3;1 -1 -1 0 0;0 5 -7 -2 0];

b=[5.5;0;0;0;0];

%m=[0 0 0 0 0;0 0 0 0 0;0 0 0 0 0;0 0 0 0 0];

a=[t,b]

n=5;

m=zeros(n,n+1);

for i=1:1:n-1

for j=i+1:1:n

m(j,i)=a(j,i)/a(i,i);

a(j,:)=a(j,:)-(m(j,i)\*a(i,:));

if(a(n,n)==0)

disp("No unique solution");

break;

end

end

end

disp(a);

x=zeros(n,1);

%x=zeros(n);

x(n)=a(n,n+1)/a(n,n);

for i=n-1:-1:1

sum=0;

for j=i+1:n

sum=sum+a(i,j)\*x(j);

end

x(i)=(a(i,n+1)-sum)/a(i,i);

end

disp("x1 x2 x3 x4 =");

disp(x);

% l=m;

% %disp(l);

u=a;

l=zeros(n,n+1);

for i=1:1:n

for j=1:1:n

if(j>i)

l(j,i)=m(j,i);

end

l(i,i)=1;

end

end

disp(l);

l=l(1:n,1:n);

disp(l);

u=u(1:n,1:n);

disp(u);

Y=inv(l)\*b;

X=inv(u)\*Y;

disp("solution to the equations are==>")

disp(X);

%Answer i1,i2,i3,i4,i5=

% 0.6785 0.4215 0.25701 0.15421 0.10280