**Bisection method**

clc;

a=5;

b=6;

c=(a+b)/2;

f= @(x) (x^2)-29;

err = 0.0001;

while abs(a-b)>err

c=(a+b)/2;

if(f(a)\*f(c)>0)

a=c;

elseif (f(a)\*f(c)<0)

b=c;

end

end

disp(c);

fixed point

clc

g = @(x) 0.5\*(atan(4\*x)+x);

e=0.001;

er=1000;

a=input('approx');

while er>e

b=g(a);

disp(b);

er = abs(b-a);

a=b;

end

disp(a);

newton method

clc;

f = @(x) x-2\*sin(x);

g = @(x) 1 - 2\*cos(x);

err= 19999;

e=0.0001;

a=input('approx');

while err>=e

b=a-f(a)/g(a);

err=abs(b-a);

a=b;

end

disp(a);

gauss elimination

clc;

a = [10 8 -3 1 16 ;

2 10 1 -4 9;

3 -4 10 1 10;

2 2 -3 10 11];

x = [0 0 0 0];

n=4;

for i=1:n-1

for j=(i+1):n

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

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

end

end

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);

gauss siedel

clc;

a = [4.63 -1.21 3.22 2.22;

-3.07 5.48 2.11 -3.17;

1.26 3.11 4.57 5.11];

n=3;

x=[0 0 0];

tol=0.001;

e=[1 1 1];

while norm(e,inf)>=tol

xold=x;

for i=1:n

sum=0;

for j=1:n

if i~=j

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

end

end

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

e(i)=x(i)-xold(i);

end

end

disp(x)

sor method

clc;

clear;

a = [4 1 -1 1 -2;

1 4 -1 -1 -1;

-1 -1 5 1 0;

1 -1 1 3 1];

e= [1 1 1 1];

tol=0.001;

n=4;

x = [0 0 0 0];

o=1.2;

while norm(e,inf)>=tol

xold=x;

for i=1:n

sum=0;

for j=1:n

if i~=j

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

end

end

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

e(i)=x(i)-xold(i);

end

end

disp(x);

power method

clc;

a = [4 1 0;

1 20 1 ;

0 1 4 ];

x= [1;1;1];

n=3;

kold=1282178;

knew=0;

tol = 0.0001;

while abs(kold-knew)>tol

y=a\*x;

kold=knew;

knew = abs(y(1));

for i=1:n

if knew<abs(y(i))

knew = abs(y(i));

end

end

x = y/knew;

end

knew

x

langrange interpolation

clc;

n=4;

x = [0 0.25 0.5 0.75 ];

f = [1 1.64872 2.71828 4.48169];

p=0.43;

for i=1:n

l(i)=1;

for j=1:n

if i~=j

l(i)=l(i)\*(p-x(j))/(x(i)-x(j));

end

end

end

sum=0;

for i=1:n

sum=sum+l(i)\*f(i);

end

disp(sum)

newton interpolation

clear;

clc;

x = [1 1.5 2 2.5];

f = [2.7183 4.4817 7.3891 12.1825];

g = @(x) exp(x);

p=2.25;

n=4;

for i=1:(n)

F(1,i)=f(i);

end

for i=2:n

for j=i:n

F(i,j)=(F(i-1,j)-F(i-1,j-1))/(x(j)-x(j-i+1));

end

end

prod(1)=1;

for i=2:n

prod(i)=1;

for j=1:i-1

prod(i)=prod(i)\*(p-x(j));

end

end

sum=0;

for i=1:n

sum = sum+ prod(i)\*F(i,i);

end

disp(sum)

comp. simpson rule

clc;

f = @(x) 1/(x\*log(x));

a = exp(1);

b = exp(1)+1;

N = 6;

h = (b-a)/N;

sum=0;

for i=1:(N-1)

x = a+ h\*i;

if mod(i,2)==0

sum=sum + 2\*f(x);

else

sum=sum + 4\*f(x);

end

end

sum = sum + f(a) + f(b);

ans = sum \* (h/3)

cmp trap. Rule

clc;

f = @(x) (cos(x))^2;

a = -0.25;

b = 0.25;

N = 4;

h = (b-a)/N;

sum=0;

for i=1:(N-1)

x = a+ h\*i;

sum = sum + 2\*f(x);

end

sum = sum + f(a) + f(b);

ans = sum \* (h/2)

euler

clc;

a=0;

b=1;

f = @(t,y) -y + (2\*cos(t));

t0=0;

y0=1;

h=0.2;

N=(b-a)/h;

for i=1:N

y1=y0 + (h\*f(t0,y0));

t1=t0 + h;

y1=y0+ (h/2)\*(f(t0,y0)+f(t1,y1));

disp(y1)

t0=t1;

y0=y1;

end

runga kutta

clc;

a=0;

b=1;

f = @(t,y) -y + (2\*cos(t));

t0=0;

y0=1;

h=0.2;

N=(b-a)/h;

for i=1:N

k1=h\*f(t0,y0);

k2=h\*f((t0 + h/2),(y0 + k1/2));

k3=h\*f((t0 + h/2),(y0 + k2/2));

k4=h\*f((t0 + h),(y0 + k3));

y1=y0 + (1/6)\*(k1 + (2\*k2) + (2\*k3) + k4)

t0=t0+h;

y0=y1;

end