

NDD

```
n=4;
for i=1:n
    x(i)=input('enter x');
    y(i)=input('enter y');
end
x0=2.25;
for i=1:n
    D(i,1)=y(i);
end
for j=2:n
    for i=j:n
        D(i,j)=(D(i,j-1)-D(i-1,j-1))/(x(i)-x(i-j+1))
    end
end
p=1;
sum=D(1,1);
for i=2:n
    p=p*(x0-x(i-1));
    sum=sum+p*D(i,i);
end
disp(sum);
```

EULER

```
a=0;
b=1;
h=0.2;
f=@(t,y)-y+2*cos(t);
t=a:h:b
y=zeros(size(t));
y(1)=1;
n=(b-a)/h;
for i=1:n
    k1=h*f(t(i),y(i));
    k2=h*f(t(i)+h, y(i)+k1);
    y(i+1)=y(i)+(1/2)*(k1+k2) ;
end
y
```

RK

```
clear all

a=0;

b=1;

h=0.2;
f=@(t,y) -y+2*cos(t);
t=a:h:b
y=zeros(size(t));
y(1)=1;
n=(b-a)/h;
for i=1:n
    %t(i+1)=t(i)+h;
    k1=h*f(t(i),y(i))
    k2=h*f(t(i)+(h/2),y(i)+(k1/2))
    k3=h*f(t(i)+(h/2),y(i)+(k2/2))
    k4=h*f(t(i)+h,y(i)+k3)
    k=(k1+2*k2+2*k3+k4)/6
```

```
y(i+1)=y(i)+k;
```

```
end
```

```
y
```

TRAPEZOIDAL

```
f=@(x) exp(-x^2)*cos(x);
```

```
a=-1;
```

```
b=1;
```

```
n=10;
```

```
h=(b-a)/n;
```

```
sum=0;
```

```
for i=1:n-1
```

```
    x(i)=a+i*h;
```

```
    y(i)=f(x(i));
```

```
    sum=sum+y(i);
```

```
end
```

```
a= (h/2)*(f(a)+f(b)+2*sum);
```

```
disp (a)
```

SIMPSON

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

```
a = exp(1) ;
```

```
b = exp(1)+1;
```

```
N = 4;
```

```
h = (b-a)/N;
```

```
sum=0;
```

```
for i = 1: N-1
```

```
    x = a + h*i;
```

```
    if rem(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);
```

```
disp(ans)
```

SECANT

```
f=@ (x) x^2-17;
```

```
x0=input('Enter x0');
```

```
x1= input ('Enter x1');
```

```
n=input('Enter iterations');
```

```
tol=input('Enter tolerance');
```

```
i=1;
```

```
while (i<=n)
```

```
    x2=x1-((x1-x0) *f (x1) ) / (f(x1)-f(x0) ) ;
```

```
    if (abs (x1-x0) <tol)
```

```
        break;
```

```
    end
```

```
    i=i+1;
```

```
    x0=x1;
```

```
    x1=x2;
```

```
end
```

```
display (x2);
```

GAUSS SEIDAL

```
A=[4,1,-1,1;1,4,-1,-1;-1,-1,5,1;1,-1,1,3];
B=[-2;-1;0;1];
N=length(B);
p=[0;0;0;0];
n=input('enter iterations');
e=0.001;
x=zeros(N,1);
y=p;
for j=1:n
    for i=1:N
        x(i)=(B(i)-A(i,([1:i-1,i+1:N]))*p([1:i-1,i+1:N]))/A(i,i);
        p(i)=x(i);
    end
    disp(j)
    disp(x)
    if abs(y-x)<e
        break
    end
    y=x;
end
```

GAUSS

```
A=[10,8,-3,1;2,10,1,-4;3,-4,10,1;2,2,-3,10];
B=[16;9;10;11];
n=length(B);
for i=1:n
    if A(i,i)==0
        for p=i+1:n
            if A(p,i)~=0
                t=A(p,:);
                A(p,:)=A(i,:);
                A(i,:)=t;
                w=B(p);
                B(p)=B(i);
                B(i)=w;
            end
        end
    end
    for j=i+1:n
        f=A(j,i)/A(i,i);
        A(j,:)=A(j,:)-f*A(i,:);
        B(j)=B(j)-f*B(i);
    end
end
for i=n:-1:1
    x(i)=(B(i)-A(i,i+1:n)*x(i+1:n))/A(i,i);
    disp(x);
end
```

NEWTON

```
syms x;
a=x^2-17;
x0=input('x0 ');
tol=0.0001;
n=20;
f=inline(a);
dif=diff(sym(a));
d=inline(dif);
```

```

i=1;
while(i<=n)
    x1=x0-((f(x0)/d(x0)))
    err=abs((x1-x0)/x1);
    if err<tol
        break;
    end
    i=i+1;
    x0=x1;
end

```

FPI

```

a=input('Enter the value of x');
N=input('Enter the no of iterations');
tol=10^-2;
y=@(x) x-((x^3+4*x^2-10)/(3*x^2+8*x));
i=1;

x=y(a);
if(x==a)
    disp(x);
else
    while(i<=N)

        x=y(a);
        if (abs(x-a)<=tol)
            disp(x);
            break;
        end
        i=i+1;
        a=x;
    end

end

```

LAGRANGE

```

n=4;
for i=1:n
    x(i)=input('enter x');
    y(i)=input('y');
end
p=0.43;
for i=1:n
    l(i)=1;
    for j=1:n
        if (j~=i)
            l(i)=((p-x(j))/(x(i)-x(j)))*l(i);
        end
    end
end
sum=0;
for i=1:n
    sum=sum+(l(i)*y(i));
end
disp(sum)

```

LU

```

A=[2,-1,1;3,3,9;3,3,5];
l=eye(3);

```

```

temp=eye(3);
n=3;
for j=1:n-1
    if(A(j,j)~=0)
        for p=i+1:n
            if(A(p,j)~=0)
                temp(p,:)=A(j,:);
                A(j,:)=A(p,:);
                A(p,:)=temp(j,:);
            end
        end
    end
    for i=j+1:n
        l(i,j)=A(i,j)/A(j,j);
        A(i,:)=A(i,:)-l(i,j)*A(j,:);
    end
end
disp(l)
disp(A)

```

BISECTION

```

f=@(x) x^2-29;
a=5;
b=6;
e=0.001;
if f(a)*f(b)<0
    while abs(b-a)>e
        c=(a+b)/2
        if f(a)*f(c)<0
            b=c;
        else
            a=c;
        end
    end
else
    disp('wrong')
end

```

POWER

```

A=[4,1,0;1,20,1;0,1,4];
x0=[1;1;1];
n=100;
tol=0.001;
k0=1;
for i=1:n
    y=A*x0
    k=max(y)
    x=y/k
    if(abs(x-x0)<tol)
        k
        break
    end
    x0=x
    k0=k
end

```