



Interpolation

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Interpolation

Use the Neville's method to find the value of $f(x)$ for $x=0.55$.

-0.2	0	0.2	0.4	0.6	0.8	1.0	1.2
-0.7328	-0.7071	-0.6528	-0.3981	0.721	3.1165	8.4372	18.0797



Interpolation

```
x=0.55;
x0=-0.2:0.2:1.2;
% fx=3*x0.^8;
% fx=3*x0.^7;
fx=[-0.7328,-0.7071,-0.6528,-0.3981,0.721,3.1165,8.4372,18.0797];
fx=fx.';
N=size(x0,2);

U=fx;
D=fx;
for L=1:N-1
    for i=1:N-L
        [U,D]=calculate_UandD_v01(x0,x,U,D,i,L);
    end
end
result1=fx(5)+U(4,2)+D(4,3)+U(3,4)+D(3,5)+U(2,6)+D(2,7)+U(1,8)

result =

    0.3493
```

```
function [U,D]=calculate_UandD_v01(x_0,x,U,D,i,j)
l=j-1;
a1=(x_0(i)-x)/(x_0(i)-x_0(i+1+1));
a2=(x_0(i+1+1)-x)/(x_0(i)-x_0(i+1+1));
D(i,j+1)=a1*(D(i+1,l+1)-U(i,l+1));
U(i,j+1)=a2*(D(i+1,l+1)-U(i,l+1));
```

Use this program to calculate $f(x) = 3 * x^7$ and $f(x) = 3 * x^8$ at $x=0.55$, and calculate error

```
result =

    0.0457

real_result =

    0.0457
```

```
result =

    0.0249

real_result =

    0.0251
```



THANKS FOR ATTENTION !