



Instituto Tecnológico de Cancún

METODOS NUMERICOS

UNIDAD 6 ACTIVIDADES INTEGRADORAS

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5.1 Polinomio de interpolación de Newton.

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
#include<iostream.h>
#include<iomanip.h>
void uno(float a);
void dos(float a,float b);
void tres(float a, float b, float c);
void cuatro(float a,float b, float c, float d);
void cinco(float a, float b, float c, float d, float e);
float bs(float f1,float f0,float x1, float x0);
float x[6],fx[6];
void main()
{
int opcion;
clrscr();
cout<<"\nINTERPOLACION DE NEWTON";
cout<<"\nCUANTOS PUNTOS";
cin>>opcion;
if(opcion<=5)
{
for(int d=0;d<opcion;d++)
{
cout<<"\nX"<<d<<": ";cin>>x[d];
cout<<"\nf(x)"<<d<<": ";cin>>fx[d];
}
switch(opcion)
{
case 1:{uno(fx[0]);}break;
case 2:{dos(x[0],x[1]);}break;
case 3:{tres(x[0],x[1],x[2]);}break;
case 4:{cuatro(x[0],x[1],x[2],x[3]);}break;
case 5:{cinco(x[0],x[1],x[2],x[3],x[4]);}break;
}
getch();
}
}
void uno(float a)
```

```

{
cout<<"\n";
cout<<"Y="<<a;
getch();
}
void dos(float a, float b)
{
cout<<"\n"<<setiosflags(ios::showpos);
cout<<setiosflags(ios::fixed);
cout<<"Y=";
cout<<bs(a,b,fx[0],fx[1])<<"X"<<bs(a,b,fx[0],fx[1])*(-a)+fx[0];
getch();
}
void tres(float a, float b, float c)
{
float t1,t2,t3;
t1=bs(a,b,fx[0],fx[1]);
t2=bs(b,c,fx[1],fx[2]);
t3=bs(a,c,t1,t2);
cout<<"\n"<<setiosflags(ios::showpos);
cout<<setiosflags(ios::fixed);

cout<<"Y="<<t3<<"X^2 "<<((-a-b)*t3)+t1<<"X"<<-(t1*a)+(fx[0])+(t3*a*b);
getch();

}
void cuatro(float a, float b, float c, float d)
{
float t1,t2,t3,t4,t5,t6;
t1=bs(a,b,fx[0],fx[1]);
t2=bs(b,c,fx[1],fx[2]);
t3=bs(c,d,fx[2],fx[3]);
t4=bs(a,c,t1,t2);
t5=bs(b,d,t2,t3);
t6=bs(a,d,t4,t5);
cout<<setiosflags(ios::showpos);
cout<<setiosflags(ios::fixed);
cout<<"\nY="<<t6<<"X^3 "<<(((((-a-b-
c)*t6)+t4)<<"X^2"<<((t6*((a*b)+(a*c)+(b*c)))+(t4*(-a-b))+t1)<<"X"<<((t6*(-
a*b*c))+((a*b)*t4)-(t1*a)+fx[0]));

```

```

getch();
}
void cinco(float a, float b, float c, float d, float e)
{
//long
float t1,t2,t3,t4,t5,t6,t7,t8,t9,t10;
t1=bs(a,b,fx[0],fx[1]);
t2=bs(b,c,fx[1],fx[2]);
t3=bs(c,d,fx[2],fx[3]);
t4=bs(d,e,fx[3],fx[4]);
t5=bs(a,c,t1,t2);
t6=bs(b,d,t2,t3);
t7=bs(c,e,t3,t4);
t8=bs(a,d,t5,t6);
t9=bs(b,e,t6,t7);
t10=bs(a,e,t8,t9);

cout<<setiosflags(ios::showpos);
cout<<setiosflags(ios::fixed);
cout<<"\n"<<fx[0]<<t1<<"(x"<<-a<<"><<t5<<"(x"<<-a<<"><<"(x"<<-
b<<"><<t8<<"(x"<<-a<<"><<"(x"<<-b<<"><<"(x"<<-
c<<"><<t10<<"(x"<<-a<<"><<"(x"<<-b<<"><<"(x"<<-c<<"><<"(x"<<-
d<<">";

getch();
}

float bs(float x0,float x1,float f0, float f1)
{
return( (f1-f0)/(x1-x0));
}

```

5.2 Polinomio de interpolación de Lagrange.

```
#include<stdio.h>
main()
{
    float x[100],y[100],a,s=1,t=1,k=0;
    int n,i,j,d=1;
    printf("\n\n Enter the number of the terms of the table: ");
    scanf("%d",&n);
    printf("\n\n Enter the respective values of the variables x and y: \n");
    for(i=0; i<n; i++)
    {
        scanf ("%f",&x[i]);
        scanf ("%f",&y[i]);
    }
    printf("\n\n The table you entered is as follows :\n\n");
    for(i=0; i<n; i++)
    {
        printf("%.3f\t%.3f",x[i],y[i]);
        printf("\n");
    }
    while(d==1)
    {
        printf("\n\n\n Enter the value of the x to find the respective value of y\n\n\n");
        scanf ("%f",&a);
        for(i=0; i<n; i++)
        {
            s=1;
            t=1;
            for(j=0; j<n; j++)
            {
                if(j!=i)
                {
                    s=s*(a-x[j]);
                    t=t*(x[i]-x[j]);
                }
            }
            k=k+((s/t)*y[i]);
        }
        printf("\n\n The respective value of the variable y is: %f",k);
        printf("\n\n Do you want to continue?\n\n Press 1 to continue and any other key to
exit");
        scanf ("%d",&d);
    }
}
```