```matlab
clear
clc

%Ejer13

Matriz2 = [1 0 0 0 0; 1 1 1 1 8.8; 1 2 2^2 2^3 29.9; 1 3 3^2 3^3
 62.0;1 4 4^2 4^3 104.7; 1 5 5^2 5^3 159.1; 1 6 6^2 6^3 222.0; 1 7
 7^2 7^3 294.5; 1 8 8^2 8^3 380.4; 1 9 9^2 9^3 471.1; 1 10 10^2 10^3
 571.7; 1 11 11^2 11^3 686.8; 1 12 12^2 12^3 809.2]

rref(Matriz2)

X = [1 0 0 0 ; 1 1 1 1; 1 2 2^2 2^3; 1 3 3^2 3^3;1 4 4^2 4^3; 1 5 5^2
 5^3; 1 6 6^2 6^3; 1 7 7^2 7^3; 1 8 8^2 8^3; 1 9 9^2 9^3; 1 10 10^2
 10^3; 1 11 11^2 11^3; 1 12 12^2 12^3]

Y = [0; 8.8; 29.9; 62.0; 104.7; 159.1; 222.0; 294.5; 380.4; 471.1;
 571.7; 686.8; 809.2]

Beta=(((X')*X)^-1)*X'*Y



% Por lo tanto la curva de minimos cuadrados deseado es, y = -0.8558
% +4.7025t + 5.5554t^2 -0.0274t^3

Tiempo = [0 1 2 3 4 5 6 7 8 9 10 11 12]

i= 1;
while i < 14
    [y(i)] = Beta(1) + Beta(2)*Tiempo(i) + Beta(3)*Tiempo(i)^2 +
 Beta(4)*Tiempo(i)^3
    i = i+1;
end
syms x
% Grafico de los puntos Tiempo e y con la linea aprosimada en Rojo

figure (1)
h = ezplot('-0.85 + 4.70*x + 5.55*x^2 + -0.02*x^3', [0,12])

set(h, 'color', 'r')

hold on

plot(Tiempo,y,'*b')

hold off

syms t
syms b1
syms b2
syms b3
```

```
syms b4
Derivada = diff(b1 + b2*t + b3*t^2 + b4*t^3, t)

t = 4.5
b1 = Beta(1)
b2 = Beta(2)
b3 = Beta(3)
b4 = Beta(4)

Estimacion = 3*b4*t^2 + 2*b3*t + b2
```

Matriz2 =

   *1.0e+03 ***

0.0010	*0*	*0*	*0*	*0*
0.0010	*0.0010*	*0.0010*	*0.0010*	*0.0088*
0.0010	*0.0020*	*0.0040*	*0.0080*	*0.0299*
0.0010	*0.0030*	*0.0090*	*0.0270*	*0.0620*
0.0010	*0.0040*	*0.0160*	*0.0640*	*0.1047*
0.0010	*0.0050*	*0.0250*	*0.1250*	*0.1591*
0.0010	*0.0060*	*0.0360*	*0.2160*	*0.2220*
0.0010	*0.0070*	*0.0490*	*0.3430*	*0.2945*
0.0010	*0.0080*	*0.0640*	*0.5120*	*0.3804*
0.0010	*0.0090*	*0.0810*	*0.7290*	*0.4711*
0.0010	*0.0100*	*0.1000*	*1.0000*	*0.5717*
0.0010	*0.0110*	*0.1210*	*1.3310*	*0.6868*
0.0010	*0.0120*	*0.1440*	*1.7280*	*0.8092*

ans =

1	*0*	*0*	*0*	*0*
0	*1*	*0*	*0*	*0*
0	*0*	*1*	*0*	*0*
0	*0*	*0*	*1*	*0*
0	*0*	*0*	*0*	*1*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*
0	*0*	*0*	*0*	*0*

X =

1	*0*	*0*	*0*
1	*1*	*1*	*1*
1	*2*	*4*	*8*
1	*3*	*9*	*27*

```
               1           4          16          64
               1           5          25         125
               1           6          36         216
               1           7          49         343
               1           8          64         512
               1           9          81         729
               1          10         100        1000
               1          11         121        1331
               1          12         144        1728


Y =

            0
       8.8000
      29.9000
      62.0000
     104.7000
     159.1000
     222.0000
     294.5000
     380.4000
     471.1000
     571.7000
     686.8000
     809.2000


Beta =

      -0.8558
       4.7025
       5.5554
      -0.0274


Tiempo =

       0     1     2     3     4     5     6     7     8     9    10
      11    12


y =

      -0.8558


y =

      -0.8558     9.3747


y =
```

```
     -0.8558     9.3747    30.5518


 y =

     -0.8558     9.3747    30.5518    62.5113


 y =

     -0.8558     9.3747    30.5518    62.5113   105.0890


 y =

     -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209


 y =

     -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427


 y =

   Columns 1 through 7

     -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

   Column 8

    294.8902


 y =

   Columns 1 through 7

     -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

   Columns 8 through 9

    294.8902   378.2994


 y =

   Columns 1 through 7

     -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

   Columns 8 through 10

    294.8902   378.2994   471.5060
```

```
y =

  Columns 1 through 7

   -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

  Columns 8 through 11

  294.8902   378.2994   471.5060   574.3459


y =

  Columns 1 through 7

   -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

  Columns 8 through 12

  294.8902   378.2994   471.5060   574.3459   686.6549


y =

  Columns 1 through 7

   -0.8558     9.3747    30.5518    62.5113   105.0890   158.1209   221.4427

  Columns 8 through 13

  294.8902   378.2994   471.5060   574.3459   686.6549   808.2690


h =

  Line with properties:

             Color: [0 0.4470 0.7410]
         LineStyle: '-'
         LineWidth: 0.5000
            Marker: 'none'
        MarkerSize: 6
   MarkerFaceColor: 'none'
             XData: [1x434 double]
             YData: [1x434 double]
             ZData: [1x0 double]

  Use GET to show all properties


Derivada =
```

```
3*b4*t^2 + 2*b3*t + b2


t =

    4.5000


b1 =

   -0.8558


b2 =

    4.7025


b3 =

    5.5554


b4 =

   -0.0274


Estimacion =

   53.0387
```
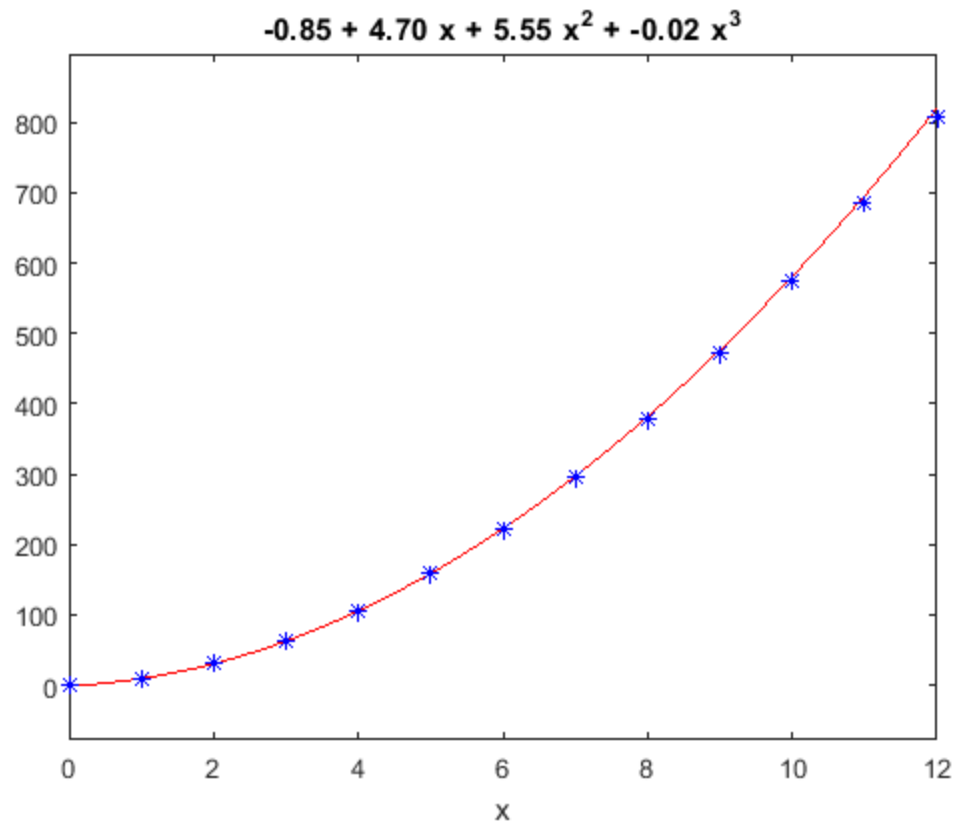
$$-0.85 + 4.70\ x + 5.55\ x^2 + -0.02\ x^3$$

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