Método de Regresión Lineal por Mínimos Cuadrados

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$$a = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2}$$

$$b = \frac{\sum y - a\sum x}{n}$$

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2}\sqrt{\sum (x - \bar{x})^2}}$$

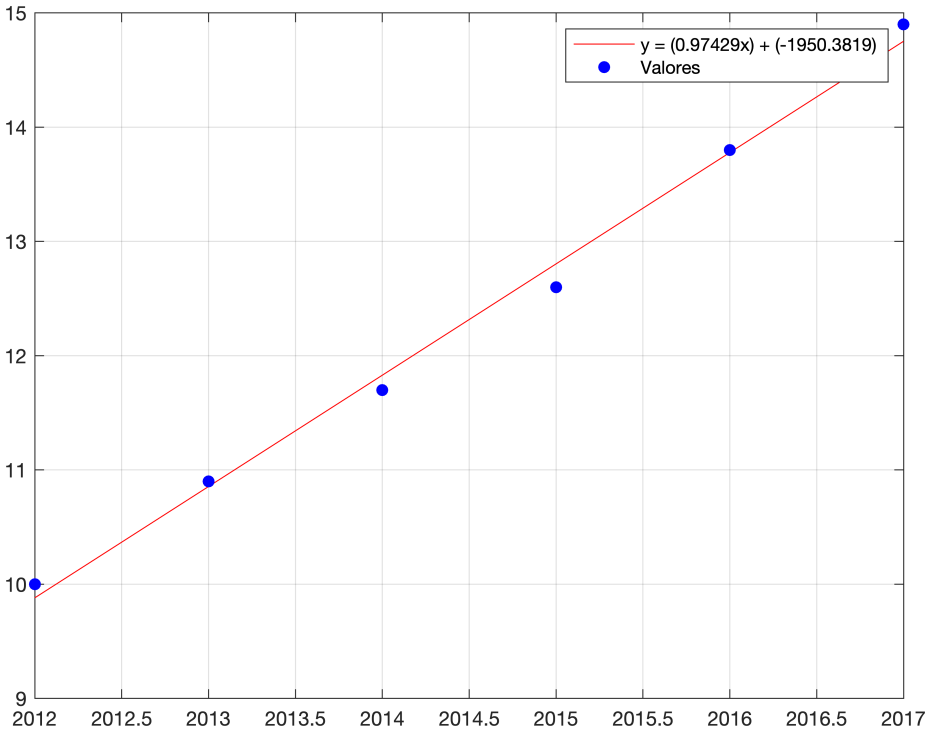
```
years = 2012:2017;
popul = [10 10.9 11.7 12.6 13.8 14.9];
varnamesYears = ["Años","Población"];

eq = LinealRegression(years,popul,varnamesYears);
```

df = 6×2 table

	Años	Población
1	2012	10
2	2013	10.9000
3	2014	11.7000
4	2015	12.6000
5	2016	13.8000
6	2017	14.9000

r = 0.9971




```
x = 2018;
while (eq(x) < popul(3)*2)
    x = x+1;
end
fprintf("En el año %d habrá el doble del población a la del 2014:\n%.4f \n",x,eq(x))
```

```
En el año 2026 habrá el doble del población a la del 2014:
23.5210
```

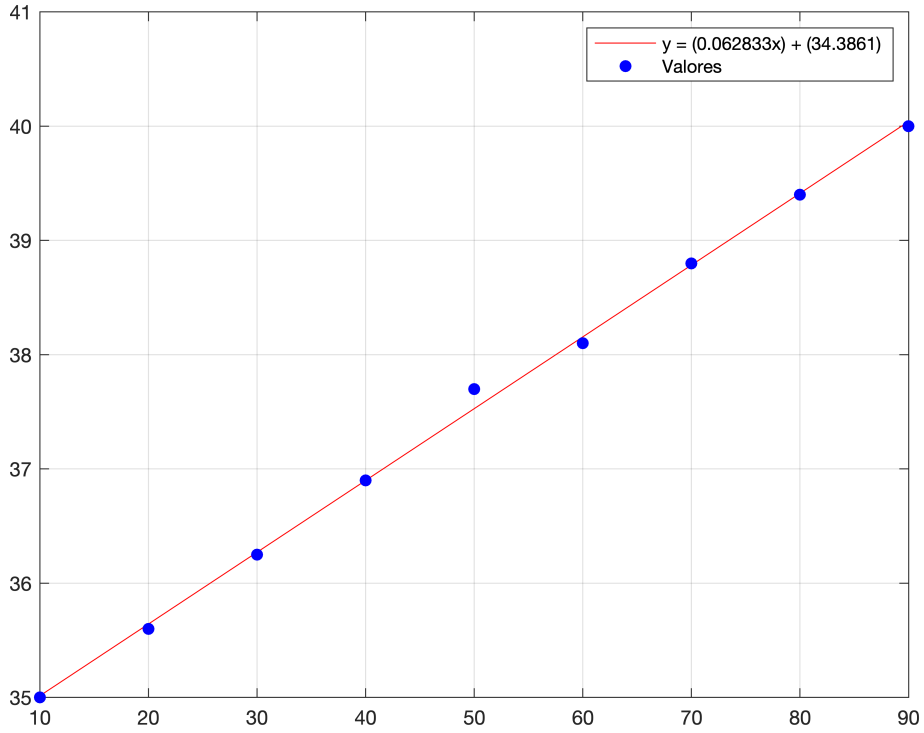
```
grados = 10:10:90;
sal = [35 35.6 36.25 36.9 37.7 38.1 38.8 39.4 40];
varnamesSal = ["T(ºC)","S(g NaCl/100 g H2O)"];
eq2 = LinealRegression(grados,sal,varnamesSal);
```

df = 9×2 table

	T(ºC)	S(g NaCl/100 g H2O)
1	10	35
2	20	35.6000
3	30	36.2500
4	40	36.9000
5	50	37.7000
6	60	38.1000

	T(°C)	S(g NaCl/100 g H2O)
7	70	38.8000
8	80	39.4000
9	90	40

```
r = 0.9992
```




```
fprintf("La predicción de la solubilidad de la sal a 25º:\n%.4f",eq2(25))
```

```
La predicción de la solubilidad de la sal a 25º:
35.9569
```

```
function f = LinealRegression(X,y,varnames)

    df = table(X',y');
    df.Properties.VariableNames = varnames

    n = length(X);
    X2 = X.^2;
    xy = X.*y;

    a = ( n.*sum(xy) - sum(X).*sum(y) )/( n.*sum(X2) - sum(X).^2 );
    b = ( sum(y) - a.*sum(X) )/(n);

    f = @(x) a.*x + b;
```

```
    x_xmean = X-mean(X);
    y_ymean = y-mean(y);
    x_xmean_y_ymean = x_xmean.*y_ymean;

    r = (sum(x_xmean_y_ymean))/( sqrt(sum(x_xmean.^2)) .* sqrt(sum(y_ymean.^2)) );

    yfit = f(X);

    plot(X,yfit,'r')
    hold on
    scatter(X,y,'filled','b')

    grid on;
    equation = "y = (" + string(a) + "x) + (" + string(b) + ")";
    legend(equation,"Valores")
    fprintf("r = %.4f",r)
    hold off
end
```