INSTITUTO TECNOLÓGICO DE SONORA

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ASIGNACIÓN 09 - MÉTODOS DE REGRESIÓN LINEAL SIMPLE Y REGRESIÓN POLINOMIAL

METODOS NUMERICOS COMPUTACIONALES

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X	1	2	3	4	5	6	7	8	9	10	11
Y	9.9	9.0	8.1	7.1	6.2	5.3	1.4	3.6	2.7	1.8	1.0

X	12	13	14
Y	-0.7	-1.5	-2.3

	X	Y	X^2	X · Y
	1	9.9	1	9.9
	2	9.0	4	18
	3	8.1	9	24.3
	4	7.1	16	28.4
	5	6.2	25	31
	6	5.3	36	31.8
	7	4.4	49	30.8
	8	3.6	64	28.8
	9	2.7	81	24.3
	10	1.8	100	18
	11	1.0	121	11
	12	-0.7	144	-8.4
	13	-1.5	169	-19.5
	14	-2.3	196	-32.2
Σ	105	54.6	1015	196.2

$$a_1 = \frac{m\sum_{i=1}^{m} yx - \sum_{i=1}^{m} x \sum_{i=1}^{m} y}{m\sum_{i=1}^{m} x^2 - \left(\sum_{i=1}^{m} x\right)^2} = \frac{12\,(196.2) - (105)(54.6)}{14\,(1015) - (105)^2}$$

$$a_1 = \frac{2746.8 - 5733}{14210 - 11025} = \frac{-2986.2}{3185} = -0.9375$$

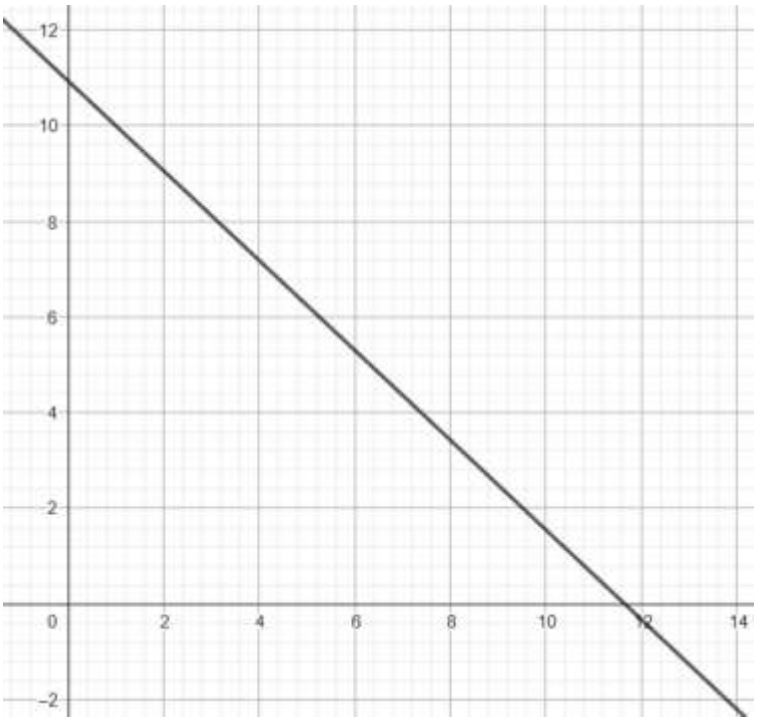
$$a_0 = \bar{y} - a_1 \bar{x} = \frac{54.6}{14} - (-0.9375)\frac{105}{14}$$

$a_0 = 3.9 + (.9375)(7.5)$

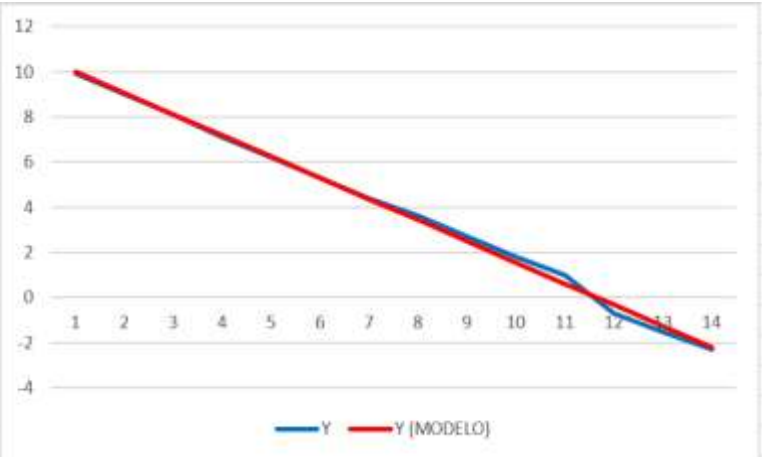
$a_0 = 3.9 + 7.0312 = 10.9312$

$y = -0.9375x + 10.9312$

$10.9312 - 0.9375(1) = 9.9937$
$10.9312 - 0.9375(2) = 9.0562$
$10.9312 - 0.9375(3) = 8.1185$
$10.9312 - 0.9375(4) = 7.1812$
$10.9312 - 0.9375(6) = 6.2437$
$10.9312 - 0.9375(6) = 5.3062$
$10.9312 - .9375(7) = 4.3687$
$10.9312 - .9375(8) = 3.4312$
$10.9312 - 0.9375(9) = 2.4937$
$10.9312 - 0.9375(10) = 1.5562$
$10.9312 - 0.9375(11) = 0.6187$
$10.9312 - 0.9375(12) = 0.3187$
$10.9312 - 0.9375(13) = -1.2562$
$10.9312 - 0.9375(14) = -2.1937$



X	Y	Y (MODELO)
1	9.9	9.9937
2	9	9.0562
3	8.1	8.1185
4	7.1	7.1812
5	6.2	6.2437
6	5.3	5.3062
7	4.4	4.3687
8	3.6	3.4312
9	2.7	2.4937
10	1.8	1.5562
11	1	0.6187
12	-0.7	-0.3187
13	-1.5	-1.2562
14	-2.3	-2.1937



X	0.05	0.4	0.8	1.2	1.6	2.0	2.4
Y	500	750	1000	1500	2000	3000	3800

$\ln 0.05 = -2.9957$
$\ln 0.4 = -0.9162$
$\ln 1.2 = 0.1823$
$\ln 0.8 = -0.2231$
$\ln 1.6 = 0.4700$
$\ln 2.0 = 0.6931$
$\ln 2.4 = 0.8754$

$\ln 500 = 6.2146$
$\ln 750 = 6.6200$
$\ln 1000 = 6.9077$
$\ln 1500 = 7.3132$
$\ln 2000 = 7.6009$
$\ln 3000 = 8.0063$
$\ln 3800 = 8.2427$

	W_i	Z_i	W_i^2	$W_i \cdot Z_i$
	-2.9957	6.2146	-8.9742	-18.6170
	-0.9162	6.6200	-0.8394	-6.0652
	-0.2231	6.9077	-0.0497	-1.5411
	0.1823	7.3132	0.0332	1.3331
	0.4700	7.6009	0.2209	3.5724
	0.6931	8.0063	0.1803	5.5491
	0.8754	8.2427	0.7663	7.2156
Σ	-1.9142	50.9054	-8.3626	-8.5551

$$b_1 = \frac{m\sum_{i=1}^{m} z_i w_i - \sum_{i=1}^{m} w_i \sum_{i=1}^{m} z_i}{m\sum_{i=1} w_i^2 - \left(\sum_{i=1}^{m} w_i\right)}$$

$$b_1 = \frac{7(-8.5551) - (-1.9142)(50.9054)}{7(-8.3626) - (-1.9142)^2}$$

$$b_1 = \frac{-59.8857 - (-97.4431)}{-58.3382 - 3.6611}$$

$$b_1 = \frac{37.5574}{-62.2023} = -0.6037$$

$$b_0 = \bar{z} - b_1 \bar{w} = \frac{50.9059}{7} = -(-0.6037)$$

$$\frac{-1.9142}{7} = 7.4372$$

$a_1 = b_1 = -0.6037 \qquad a_0 = e^{b_0} = e^{7.4372}$

$= 1697.9891$

Curva de regresion:

$y = 1697.9891\, x^{0.6037}$

1697.9891	$(0.05)^{0.6037}$	$=$	278.2935
1697.9891	$(0.4)^{0.6037}$	$=$	976.5590
1697.9891	$(0.8)^{0.6037}$	$=$	1483.9877
1697.9891	$(1.2)^{0.6037}$	$=$	1895.5559
1697.9891	$(1.6)^{0.6037}$	$=$	2255.0809
1697.9891	$(2.0)^{0.6037}$	$=$	2580.2792
1697.9891	$(2.4)^{0.6037}$	$=$	2880.5036

X	Y	Y (MODELO)
0.05	500	278.2935
0.4	750	976.559
0.8	1000	1483.9877
1.2	1500	1895.5559
1.6	2000	2255.0809
2	3000	2580.2792
2.4	3800	2880.5036