$\frac{1}{m}(\theta_0 + \theta_1 \cdot x_1 - y_1) \cdot x_j$ $\quad \theta_0 = 0.2$

$\frac{1}{3}\underbrace{((0,2) + (-1))}_{-0.8} + \underbrace{(0,2) + 0,26 - 2)}_{-1,54}\frac{1}{3} + \frac{1}{3}\underbrace{(0,2 + 0.26 \cdot 2 - 3)}_{-2.28}$

$-0,8 - 1,54 - 2,28 = -4,62$

$\frac{-4,62}{3} = -1,54$

$\theta_0 = \theta_0 - \alpha \cdot \frac{\partial J(\theta_0)}{\partial \theta_j} \longrightarrow \theta_0 = 0,2 - (0.1)(-1,54)$

$\theta_0 = 0,046$

$\frac{1}{3}((0,2 + 0,26 \cdot 0 - 1) + \underbrace{(0,2 + 0,26 \cdot 1 - 2) \cdot 1)}_{-1,54} + \underbrace{(0,2 + 0,26 \cdot 2 - 3) \cdot 2}_{-4,56})$

$-1,54 - 4,56 = -6.1$

$\frac{-6.1}{3} = -2.03$

$\theta_1 = \theta_1 - \alpha \frac{\partial J(\theta)}{\partial \theta_j} \longrightarrow \theta_1 = 0,26 - (0.1)(-2.03)$

$\theta_1 = 0,463$

Adim 3 = $\frac{1}{m}(\theta_0 + \theta_1 . x_i - y_i) . x_j$

$\frac{1}{3}[\underbrace{(0,046 + 0,463.0 - 1)}_{0} + \underbrace{(0,046 + 0,463.1 - 2)}_{-1,491} + \underbrace{(0,046 + 0,463.2 - 3)}_{-2,028}]$

$-1,491 - 2,028 = \frac{-3,519}{3}$

$= -1,491$

$\theta_0 = \theta_0 - \alpha \frac{\partial J(\theta_0)}{\partial \theta_0} \longrightarrow 0,046 - (0.1).(-1,491)$

$= 0,1951$

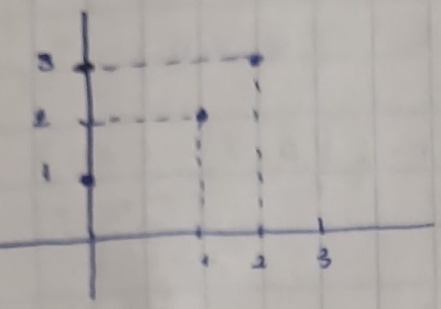
$\frac{1}{3}(\underbrace{(0,046 + 0,463.0 - 1)}_{0} + \underbrace{(0,046 + 0,463.1 - 2)}_{-1,491}.1 + \underbrace{(0,046 + 0,463.2 - 3)}_{-2,056}2)$

$\frac{-5,547}{3} = -1,849$

$\theta_1 = \theta_1 - \alpha \frac{\partial J(\theta_1)}{\partial \theta_1} \longrightarrow 0,463 - (0,1)(-1,849)$

$= 0,6479$

ÖRNEK



x	y
0	1
1	2
2	3

Doğrusal regresyon yöntemiyle verilen modeli çıkarınız.

Çözüm:

Model polinomu $h_\theta(x) = \theta_0 + \theta_1 x$

Başlangıç aşamasında $\theta_0 = 0$, $\theta_1 = 0$

x	$h_\theta(x)$	y	Hata
0	$0 + 0.0 = 0$	1	-1
1	$0 + 0.1 = 0$	2	-2
2	$0 + 0.2 = 0$	3	-3

$$J(\theta) = \frac{1}{2m} \sum_{i=1}^{m} \left(h_\theta(x_i) - y_i \right)^2$$

$$J(\theta) = \frac{1}{2.3} \sum_{i=1}^{3} \left(h_\theta(x_i) - y_i \right)^2 = \frac{1}{6} \left((-1)^2 + (-2)^2 + (-3)^2 \right) = 14/6$$

$$\theta_J = \theta_J - \alpha \frac{\partial J(\theta)}{\partial \theta_J}$$

$$\frac{\partial J(\theta)}{\partial \theta_0} = \frac{1}{m} \sum_{i=1}^{m} \left(\theta_0 + \theta_1 x_i - y_i \right) \cdot 1 = \frac{1}{3} \left[(-1) + (-2) + (-3) \right] = -2$$

$$\frac{\partial J(\theta)}{\partial \theta_1} = \frac{1}{m} \sum_{i=1}^{m} \left(\theta_0 + \theta_1 x_i - y_i \right) \cdot x_i = \frac{1}{3} \left[(-1).0 + (-2).1 + (-3)2 \right] = -\frac{8}{3} =$$

$$\theta_0 = 0 - (0.1)(-2) = 0.2$$

$$\theta_1 = 0 - (0.1)(-2.6) = 0.26$$