

$$\begin{aligned}
h_{\theta}(x) &= \theta_0 + \theta_1 x \\
J(\theta) &= \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2 \\
&J(\theta_0, \theta_1) \\
\theta_j &= \theta_j - \alpha \frac{\partial J(\theta)}{\partial \theta_j}
\end{aligned}$$

Repeat until converge {

$$\begin{aligned}
tmp0 : \theta_0 &= \theta_0 - \alpha \frac{\partial J(\theta)}{\partial \theta_0} \\
tmp1 : \theta_1 &= \theta_1 - \alpha \frac{\partial J(\theta)}{\partial \theta_1}
\end{aligned}$$

}

$$\frac{\partial J(\theta)}{\partial \theta_j} = \frac{\partial}{\partial \theta_j} \left(\frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2 \right) = \frac{\partial}{\partial \theta_j} \left(\frac{1}{2m} \sum_{i=1}^m (\theta_0 + \theta_1 x^{(i)} - y^{(i)})^2 \right)$$

j = 0:

$$\frac{\partial J(\theta)}{\partial \theta_0} = \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})$$

j = 1:

$$\frac{\partial J(\theta)}{\partial \theta_1} = \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x^{(i)}$$

$$h_{\theta}(x) = \theta_0 x_0 + \theta_1 x_1 + \theta_2 x_2 \cdots + \theta_n x_n$$

Repeat until converge {

$$\theta_j = \theta_j - \alpha \frac{\partial J(\theta)}{\partial \theta_j} = \theta_j - \alpha \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x_j^{(i)}$$

}