

$$J(\theta) = \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2 \Rightarrow \text{cost function}$$

CODE $\Rightarrow J = \text{cost function } J(X, y, \text{theta})$

$$m = \text{length}(y)$$

$$\text{Predictions} = X * \text{theta} \Rightarrow \mathbb{R}^{n+1 \times 1}$$

$$\mathbb{R}^{m \times n+1} \Downarrow \mathbb{R}^{m \times 1}$$

SquareErrors = (predictions - y) . ^ 2 ;

$$\begin{bmatrix} h_{\theta}(x^{(1)}) \\ h_{\theta}(x^{(2)}) \\ \vdots \\ h_{\theta}(x^{(m)}) \end{bmatrix}$$

$$y = \begin{bmatrix} y^{(1)} \\ y^{(2)} \\ \vdots \\ y^{(m)} \end{bmatrix}$$

$$\mathbb{R}^{m \times 1} \Downarrow \mathbb{R}^{m \times 1}$$

$$\begin{bmatrix} (h_{\theta}(x^{(1)}) - y^{(1)})^2 \\ (h_{\theta}(x^{(2)}) - y^{(2)})^2 \\ \vdots \\ (h_{\theta}(x^{(m)}) - y^{(m)})^2 \end{bmatrix} \Rightarrow \mathbb{R}^{m \times 1}$$

$$\text{prediction} - y = \begin{bmatrix} h_{\theta}(x^{(1)}) - y^{(1)} \\ h_{\theta}(x^{(2)}) - y^{(2)} \\ \vdots \\ h_{\theta}(x^{(m)}) - y^{(m)} \end{bmatrix}$$