## Gradient Descent For Multiple Variables

## **Gradient Descent for Multiple Variables**

The gradient descent equation itself is generally the same form; we just have to repeat it for our 'n' features:

repeat until convergence: {
$$\theta_{0} := \theta_{0} - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x_{0}^{(i)}$$

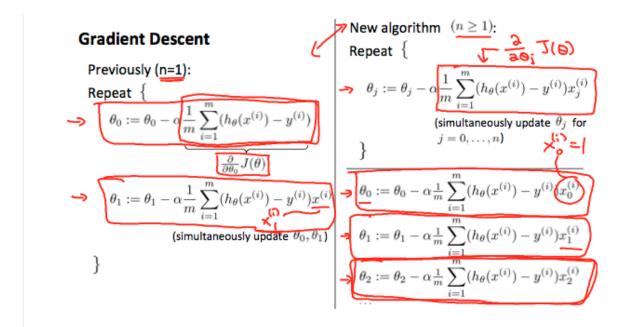
$$\theta_{1} := \theta_{1} - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x_{1}^{(i)}$$

$$\theta_{2} := \theta_{2} - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x_{2}^{(i)}$$
...
}

In other words:

repeat until convergence: { 
$$\theta_j := \theta_j - \alpha \frac{1}{m} \sum_{i=1}^m (h_\theta(x^{(i)}) - y^{(i)}) \cdot x_j^{(i)} \qquad \text{for } j := 0...n$$
 }

The following image compares gradient descent with one variable to gradient descent with multiple variables:



✓ Complete





