

2

$$Q_0 = 0.2$$

$$Q_1 = 0.26$$

x	y	$h_0(x)$	$h_0 - y$
0	1	$0.2 + 0.006$	-0.8
1	2	$0.211 + 0.26$	-1.54
2	3	$0.2 + 2.026$	-2.28

$$J(\theta) = \frac{1}{2m} \sum_{i=1}^m (h_0(x_i) - y_i)^2 \quad J(0) = \frac{1}{2 \cdot 3} \sum_{i=1}^3 (h_0(x_i) - y_i)^2 = \frac{1}{6} (1 - 0.8)^2 + (1 - 1.54)^2 + (-2.28)^2 = 1.56$$

$$u_j = Q_j - \alpha \quad \frac{d_j(\theta)}{d\theta}$$

( $\alpha = 0.1$ )

$$\frac{d_j(\theta)}{dQ_0} = \frac{1}{m} \sum_{i=1}^m (Q_0 + Q_1 x_i - y_i) = \frac{1}{3} [1 - 0.8 + (-1.54) + (-2.28)] = -1.54$$

$$\frac{d_j(\theta)}{dQ_1} = \frac{1}{m} \sum_{i=1}^m (Q_0 + Q_1 x_i - y_i) \cdot x_i = \frac{1}{3} (1 - 0.8) \cdot 0 + (-1.54) \cdot 1 + (-2.28) \cdot 2$$

$$Q_0 = 0.2 - (0.1) \cdot (-1.54) = 0.354$$

$$Q_1 = 0.26 - (0.1) \cdot (-2.03) = 0.463$$

3

$$Q_0 = 0.354$$

$$Q_1 = 0.463$$

x	y	$h_0(x)$	$h_0 - y$
0	1	$0.354 + 0.006$	-0.644
1	2	$0.354 + 1.0463$	-1.183
2	3	$0.354 + 2.0463$	-1.72

$$J(\theta) = \frac{1}{2 \cdot 3} \sum_{i=1}^3 (h_0(x_i) - y_i)^2 = \frac{1}{6} (1 - 0.644)^2 + (-1.183)^2 + (-1.72)^2 = 0.795$$

$$u_j = Q_j - \alpha$$

$$\frac{d_j(\theta)}{dQ_0} = \frac{1}{m} \sum_{i=1}^m (Q_0 + Q_1 x_i - y_i) = \frac{1}{3} [1 - 0.644 + (-1.183) + (-1.72)] = -1.183$$

$$\frac{d_j(\theta)}{dQ_1} = \frac{1}{m} \sum_{i=1}^m (Q_0 + Q_1 x_i - y_i) \cdot x_i = \frac{1}{3} [1 - 0.644] \cdot 0 + [(-1.183) \cdot 1 + (-1.72) \cdot 2] = -1.541$$

$$Q_0 = 0.354 - (0.1) \cdot (-1.183) = 0.4723$$

$$Q_1 = 0.463 - (0.1) \cdot (-1.541) = 0.6171$$