$$\underset{\theta_0,\, \theta_1 \,|\, x_i, y_i}{\operatorname{argmin}} \sum_{i=1}^{n} (y_i - (\theta_0 + \theta_1 x_i))^2$$

θ_0

$$\frac{\partial}{\partial \theta_0} = \frac{\partial}{\partial \theta_0} \sum_{i=1}^{n} (y_i - (\theta_0 + \theta_1 x_i))^2$$

$$\frac{\partial}{\partial \theta_0} = -2 \sum_{i=1}^{n} (y_i - (\theta_0 + \theta_1) x_i))$$

$$\sum_{i=1}^{n} (y_i - \theta_0 + \theta_1 x_i)) = 0$$

$$\sum_{i=1}^{n} y_i = n\,\theta_0 + \theta_1 \sum_{i=1}^{n} x_i$$

θ_1

$$\sum_{i=1}^{n} x_i (y_i - (\theta_0 + \theta_1 x_1)) = 0$$

$$\sum_{i=1}^{n} x_i y_i = \theta_0 \sum_{i=1}^{n} x_i + \theta_1 \sum_{i=1}^{n} x^2_i$$

$$\sum_{i=1}^{n} y_i = n\theta_0 + \theta_1 \sum_{i=1}^{n} x_i$$

$$\sum_{i=1}^{n} x y_i = \theta_0 \sum_{i=1}^{n} x_i + \theta_1 \sum_{i=1}^{n} x_i^2$$

$$\theta_1 = \sum_{i=1}^{n} \frac{(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n} (x_i - \bar{x})^2}$$

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

$$\bar{y} = \frac{1}{n} \sum_{i=1}^{n} y_i$$

$$\theta_0 = \bar{y} - \theta_1 \bar{x}$$

$\Sigma x = 210$ $\quad$ $\Sigma y = 485.53$

$\bar{x} = 10.5$ $\quad$ $\bar{y} = 24.27$

$$\theta_1 = \frac{\Sigma(x_1 - \bar{x})(y_1 - \bar{y})}{\Sigma x_i - \bar{x})^2}$$

$\Sigma(x_1 - \bar{x})(y_1 - \bar{y}) = 1170.081$

$\Sigma(x_1 - \bar{x})^2 = 655.0$

$= 1.786$

$$y = 5.52 + 1.786\,x$$

$\theta_0 = 24.27 - (1.78)(10.5) = 5.52$