$$\frac{1}{n}\sum(y_i-\hat{y}_i)^2 = \frac{1}{n}\sum(y_i-(ax_i+b))^2 = F(a)$$

if $f(a) = (y_i - x_i a - b)^2$ and $(y_i - b) = k$,

$$f(a) = (-x_i a + k)^2 = x_i^2 a^2 - 2kx_i a + k^2$$

$$\frac{\partial f(a)}{\partial a} = 2x_i^2 a - 2kx_i = 2x_i(x_i a - y_i + b)$$

In Conclusion,

$$\frac{\partial F(a)}{\partial a} = \underline{\frac{2}{n}\sum x_i(x_i a - y_i + b)}$$

∂a

$$\frac{1}{n}\sum (y_i - \hat{y}_i)^2 = \frac{1}{n}\sum (y_i - (ax_i + b))^2 = F(b)$$

$$f(b) = (y_i - (ax_i + b))^2 \text{ and } (y_i - ax_i) = k$$

$$f(b) = (-b + k)^2 = b^2 - 2kb + k^2$$

$$\frac{\partial f(b)}{\partial b} = 2b - 2k = 2(b - k) = 2(b - y_i + ax_i)$$

In Conclusion,

$$\partial F(b) = \frac{2}{n}\sum (b - y_i + ax_i)$$

Fb