Linear Model : $f_{w,b}(x) = wx + b$

Cost function : $J(w,b) = \frac{1}{2m} \sum_{i=1}^{m} \left[f(x^i) - y^i \right]^2$

↳ mean square error

we know

$$w = w - \alpha \frac{\partial J}{\partial w} \quad \text{—①}$$

↑ LR

similarly,

$$b = b - \alpha \frac{\partial J}{\partial b} \quad \text{—②}$$

$$\frac{\partial J}{\partial w} = \frac{1}{2m} \sum_{i=1}^{m} x \left[f x^i - y^i \right] x x_i$$

↑ chain rule

similarly

$$\frac{\partial J}{\partial b} = \frac{1}{m} \sum_{i=1}^{m} \left[f x^i b - y^i \right]$$

by subsituting for partial derivatives in ① & ② we get

Gradient descent using linear regression.