$$\theta_j := \theta_j\left(1 - \alpha\frac{\lambda}{m}\right) - \alpha\frac{1}{m}\sum_{i=1}^{m}\left(h_\theta(x^{(i)}) - y^{(i)}\right)x_j^{(i)}$$

$\left[1 - \alpha\frac{\lambda}{m} < 1\right]$

$\hookrightarrow \underbrace{0.99}$ Just little bit less than 1.

$$\theta_j := \underbrace{\theta_j\underbrace{\left(1-\alpha\frac{\lambda}{m}\right)}_{0.99 \approx < 1}}_{0.99\,\theta_j} - \underbrace{\frac{\alpha}{m}\sum_{i=1}^{m}\left(h_\theta(x^{(i)}) - y^{(i)}\right)x_j^{(i)}}_{\text{Original Grad. desc. formula without regularization}}$$

Normal Eq^n (with Regularization)

$$X = \begin{bmatrix} (x^{(1)})^T \\ \vdots \\ (x^{(m)})^T \end{bmatrix}_{m\times(n+1)} \qquad y = \begin{bmatrix} y^{(1)} \\ \vdots \\ y^{(m)} \end{bmatrix} \Rightarrow \mathbb{R}^m$$

$\min_\theta J(\theta)$

$$\hookrightarrow \theta = \Big(X^TX + \lambda \underbrace{\begin{bmatrix} 0 & & & \\ & 1 & & \\ & & \ddots & \\ & & & 1 \end{bmatrix}}_{(n+1)(n+1)}\Big)^{-1} X^T y$$

Eg) $n=2 \Rightarrow \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$