LR-GRADIENT-DESCENT($\theta_{init}, \theta_{0init}, \eta, \epsilon$)

$\theta^{(0)} = \theta_{init}$

$\theta_0^{(0)} = \theta_{0init}$

$t = 0$

repeat

$t = t + 1$

$\theta^{(t)} = \theta^{(t-1)} - \eta \left(\frac{1}{n} \sum_{i=1}^{n} \left(\sigma \left(\theta^{(t-1)^T} x^{(i)} + \theta_0^{(t-1)} \right) - y^{(i)} \right) x^{(i)} + \lambda \theta^{(t-1)} \right)$

$\theta_0^{(t)} = \theta_0^{(t-1)} - \eta \left(\frac{1}{n} \sum_{i=1}^{n} \left(\sigma \left(\theta^{(t-1)^T} x^{(i)} + \theta_0^{(t-1)} \right) - y^{(i)} \right) \right)$

until $\left| J_{lr}(\theta^{(t)}, \theta_0^{(t)}) - J_{lr}(\theta^{(t-1)}, \theta_0^{(t-1)}) \right| < \epsilon$

return $\theta^{(t)}, \theta_0^{(t)}$