$$\mathcal{L}(a(x), y) = \log(1 + \exp(-y a(x))), \ y \in \{-1, 1\}, \ a(x) \in (-\infty, +\infty)$$

$$\frac{\partial \mathcal{L}}{\partial w} = \frac{1 \cdot \exp(-y a(x)) \cdot -y \vec{x}}{1 + \exp(-y a(x))} = \frac{-y \vec{x}}{1 + \exp(-y \bar{w}^T \bar{x})}, \text{ где}$$

$$\vec{x} = (x_0, \ldots, x_n)^T, \ \vec{w} = (1, w_1, \ldots, w_n)^T$$

Для l2 регуляризации:

$$\frac{\partial \mathcal{L}}{\partial w} = \frac{-y \vec{x}}{\exp(-y \bar{w}^T \bar{x}) + 1} + 2\lambda \vec{w}$$