

HILTON CARMELO DE FREITAS

MUSP 15515874

FUNÇÃO  $\rightarrow \sum X_i (y_i - \hat{y}_i)$   
GRADIENTE

$$\frac{1}{N} \sum X_i (y_i - \hat{y}_i) = \sum X_i (y_i - \frac{1}{N} \hat{y}_i)$$

$$\frac{1}{N} \hat{y}_i = \frac{1}{N} \left( \frac{1}{1 + e^z} \right) = \frac{(1+c)^{-1}}{(1+c)^2} = \frac{-\bar{e}^2}{(1+e)^2}$$

$$\Rightarrow \frac{1}{(1+\bar{e}^2)} \cdot \frac{-\bar{e}^2}{(1+\bar{e}^2)} = \hat{y}_i (1 - \hat{y}_i)$$

COMO  $\hat{y}_i = \sigma(w^T x_i)$ , PELA REGR. DA CADEIA:

$$\frac{d}{dw_i} \Delta G = - \sum x_{i,j} \cdot \frac{1}{N} \hat{y}_i = - \sum x_{i,j} \frac{x_{i,j}}{N} (\hat{y}_i (1 - \hat{y}_i) x_{i,j})$$

$$= - \sum \hat{y}_i (1 - \hat{y}_i) x_{i,j} x_{i,j}$$

ISTO EQUIVALE A  $-X^T S X$ , SENDO  $S$  UMA MATRIZ DIAGONAL DE  $\hat{y}_i (1 - \hat{y}_i)$

Logo  $H(w) = -X^T S X$