

P.D. Si  $\sigma(x) = \frac{1}{1 + e^{-x}}$

$$\Rightarrow \sigma'(x) = \sigma(x)(1 - \sigma(x))$$

DEMO:

Sea  $\sigma(x) = \frac{1}{1 + e^{-x}}$

$$\Rightarrow \sigma'(x) = \frac{d(1 + e^{-x})^{-1}}{dx} = \frac{(0)(1 + e^{-x}) - (1)(-e^{-x})}{(1 + e^{-x})^2}$$

Propiedades derivada

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$$

$$\sigma'(x) = \frac{e^{-x}}{(1 + e^{-x})^2} = \left(\frac{1}{1 + e^{-x}}\right) \left(\frac{e^{-x} + 1 - 1}{1 + e^{-x}}\right)$$

$$= \left(\frac{1}{1 + e^{-x}}\right) \left(1 - \frac{1}{1 + e^{-x}}\right) = \sigma(x)(1 - \sigma(x))$$

