Derivative of sigmoid

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$$f\big(h(w)\big) = \boxed{\dfrac{1}{1 + e^{-h(w)}}} \quad \leftarrow \text{binary sigmoid}$$

$$= \dfrac{e^{h(w)}}{1 + e^{h(w)}}$$

$$\frac{\partial f\big(h(w)\big)}{\partial w} = \frac{\partial}{\partial w}\left(\frac{1}{1 + e^{-h(w)}} \right)$$

$$\frac{\partial}{\partial w}\left(\frac{g(w)}{z(w)} \right) = \frac{g' \cdot z - g \cdot}{z^2}$$

$$g(w) = 1$$

$$z(w) = 1 + e^{-h(w)}$$

$$\frac{\partial}{\partial w} e^{-h(w)} \qquad -h(w) \cdot \partial \, \frac{-h(w)}{w}$$