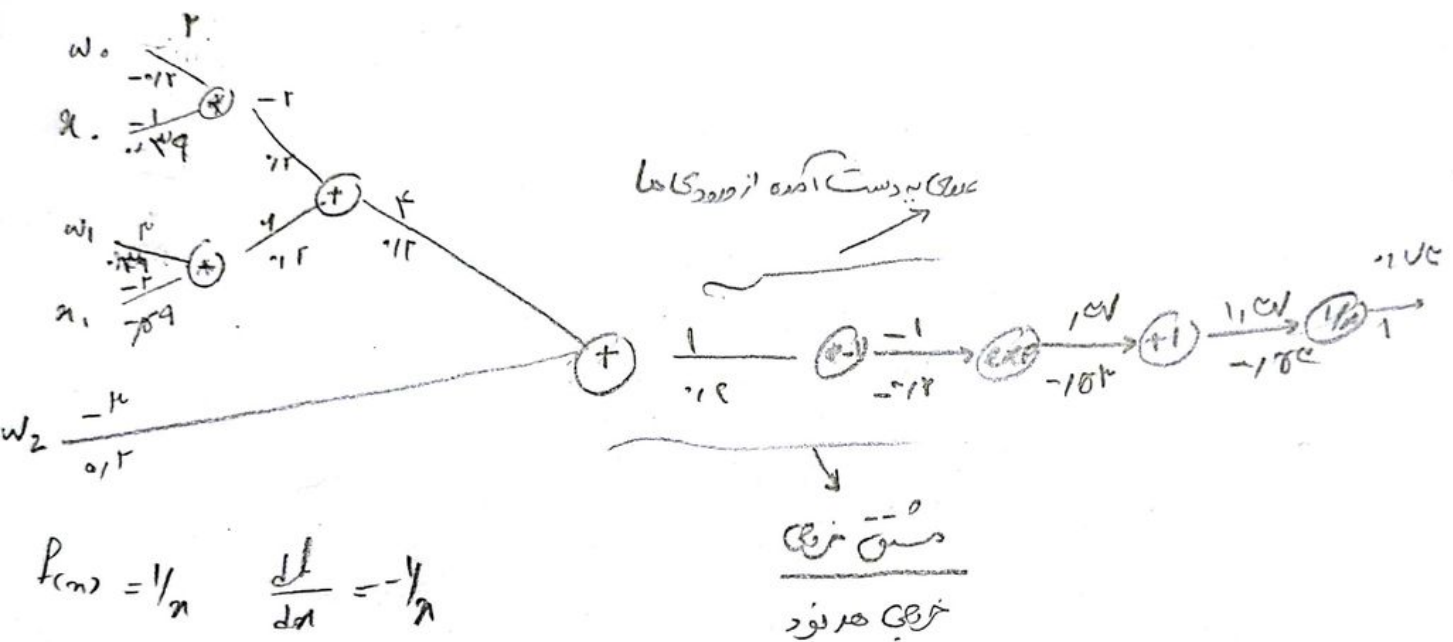


4-2 (10)

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$$f_c(\omega, n) = \frac{1}{1 + e^{-(\omega_0 n + \omega_1 n + \omega_2 n + \omega_3 n)}}$$

$$\omega_0 = 1, \omega_1 = -1, \omega_2 = -1, \omega_3 = -1$$



$$f_c(n) = \frac{1}{n} \quad \frac{df}{dn} = -\frac{1}{n^2}$$

$$f_c(n) = c + n \quad \frac{df}{dn} = 1$$

$$f_c(n) = an \quad \frac{df}{dn} = a$$

$$f_c(n) = e^n \quad \frac{df}{dn} = e^n$$

$$b(n) = \frac{1}{1 + e^{-n}} \rightarrow \frac{db(n)}{dn} = \frac{e^{-n}}{(1 + e^{-n})^2} = \frac{1 \cdot (1 + e^{-n}) - 1}{(1 + e^{-n})^2} = \frac{e^{-n}}{(1 + e^{-n})^2}$$

$$= b(n)(1 - b(n))$$