

correction méthode

$$1) \quad y' + y = \frac{1}{1+e^n}$$
$$y' + y = \frac{1}{1+e^n} \dots \dots \textcircled{1}$$

La solution est  $y(n) = y_H(n) + y_P(n)$  0,5

$$y' + y = 0 \quad \Leftrightarrow \quad \frac{dy}{dn} = -y$$

$$\frac{dy}{y} = -dn \quad \textcircled{1,5} \quad \int \frac{dy}{y} = - \int dn$$

$$\ln y = -n + c \quad \Rightarrow \quad y_H(n) = K e^{-n} \quad / \quad K = e^c \in \mathbb{R}$$
1

$$y_P(n) = k(n) e^{-n} \quad \left( \begin{array}{l} \text{La méthode de la variation de} \\ \text{de constante} \end{array} \right)$$
1

$$y'_P(n) = k'(n) e^{-n} - k(n) e^{-n}$$

on remplace dans  $\textcircled{1}$

$$\textcircled{1} : k'(n) e^{-n} - k(n) e^{-n} + k(n) e^{-n} = \frac{1}{1+e^n}$$
$$k'(n) e^{-n} = \frac{1}{1+e^n} \quad \Leftrightarrow \quad k'(n) = \frac{e^n}{1+e^n}$$
1

$$k(n) = \int \frac{e^n}{1+e^n} dn = \ln |1+e^n| + \alpha \quad / \quad \alpha \in \mathbb{R}$$
1

$$y_P(n) = (\ln |1+e^n| + \alpha) e^{-n}$$
1

$$y(n) = y_H(n) + y_P(n)$$