

$$(12) \quad y' + 9y = 23 \cos(5x) - \sin(5x)$$

Mon: $y = A e^{-9x}$ ou $A \in \mathbb{R}$

Sol particulière = M.V.C. $y_p = a \cos(5x) + b \sin(5x)$

$$y_p' = -5a \sin(5x) + 5b \cos(5x)$$

$$y_p' + 9y_p = -5a \sin(5x) + 5b \cos(5x) + 9a \cos(5x) + 9b \sin(5x) \\ = (5b + 9a) \cos(5x) + (9b - 5a) \sin(5x) = 23 \cos(5x) - \sin(5x)$$

$$\Rightarrow \begin{cases} 5b + 9a = 23 & \times 5 \\ 9b - 5a = -1 & \times 9 \end{cases} \Leftrightarrow \begin{cases} 25b + 45a = 115 \\ 81b - 45a = -9 \end{cases}$$

$$L_1 + L_2: 106b = 115 - 9 = 106 \Rightarrow \boxed{b = 1} \Rightarrow 5a = 1 + 9b = 10$$

$$\Rightarrow \boxed{a = 2}$$

$$y_p = 2 \cos(5x) + \sin(5x)$$

Sol de l'éq complète: $y = A e^{-9x} + 2 \cos(5x) + \sin(5x)$ ou $A \in \mathbb{R}$