

$$\textcircled{2} \begin{cases} y'' + y = x \\ y(0) = 1 \\ y'(0) = 0 \end{cases}$$

- 1, 1, x son cont. en $\mathbb{R}$
- 1 to $\forall x \in \mathbb{R}$
- 2 cond. iniciales en $0 \in \mathbb{R}$

$\left\{ \begin{array}{l} \text{I sol. } y \text{ es } \text{única} \end{array} \right.$

$$y'' + y = 0 \Rightarrow m^2 + 1 = 0 \quad m = \sqrt{-1} = \pm j \Rightarrow \boxed{y_c(x) = C_1 \cdot \cos(x) + C_2 \cdot \sin(x)}$$

$$\begin{aligned} \bullet x &\Rightarrow \{x, 1\} \Rightarrow y_p(x) = Ax + B \\ y_p'(x) &= A \\ y_p''(x) &= 0 \end{aligned} \quad \begin{aligned} 0 + Ax + B &= x \Rightarrow B = 0 \\ A &= 1 \end{aligned}$$

$$\boxed{y_p(x) = x}$$

$$\boxed{y(x) = C_1 \cdot \cos(x) + C_2 \cdot \sin(x) + x} \Rightarrow y'(x) = -C_1 \sin(x) + C_2 \cos(x) + 1$$

$$\begin{aligned} y(0) &= 1 \Rightarrow C_1 = 1 \\ y'(0) &= 0 \Rightarrow C_2 = -1 \end{aligned} \Rightarrow y(x) = \cos(x) - \sin(x) + x$$