

ESERCIZI SULLE EQUAZIONI DIFFERENZIALI LINEARI A COEFFICIENTI  
COSTANTI

Risolvere i seguenti problemi di Cauchy.

1.

$$(a) \begin{cases} y'' + 2y' + 2y = 0 \\ y(0) = 0, \quad y'(0) = 1 \end{cases}, \quad (b) \begin{cases} y'' + 2y' + 2y = \cos(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

$$(c) \begin{cases} y'' + 2y' + 2y = x^2 \sin(x) \\ y(0) = 0, \quad y'(0) = 1 \end{cases}, \quad (d) \begin{cases} y'' + 2y' + 2y = xe^x \cos(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

2.

$$(a) \begin{cases} y'' + 4y' = 0 \\ y(0) = 1, \quad y'(0) = 0 \end{cases}, \quad (b) \begin{cases} y'' + 4y' = x \cos(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

3.

$$(a) \begin{cases} y'' + y' - 6y = 0 \\ y(0) = 1, \quad y'(0) = 0 \end{cases}, \quad (b) \begin{cases} y'' + y' - 6y = x^2 \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

$$(c) \begin{cases} y'' + y' - 6y = xe^x \\ y(0) = 0, \quad y'(0) = 0 \end{cases}, \quad (d) \begin{cases} y'' + y' - 6y = xe^{2x} \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

4.

$$(a) \begin{cases} y'' - 4y' + y = 0 \\ y(0) = 1, \quad y'(0) = 1 \end{cases}, \quad (b) \begin{cases} y'' - 4y' + y = x^2 \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

$$(c) \begin{cases} y'' - 4y' + y = xe^x \\ y(0) = 0, \quad y'(0) = 0 \end{cases}, \quad (d) \begin{cases} y'' - 4y' + y = xe^{2x} \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

5.

$$(a) \begin{cases} y'' - 4y' + 8y = 0 \\ y(0) = 0, \quad y'(0) = -1 \end{cases}, \quad (b) \begin{cases} y'' - 4y' + 8y = x \cos(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

$$(c) \begin{cases} y'' - 4y' + 8y = e^{2x} \sin(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}, \quad (d) \begin{cases} y'' - 4y' + 8y = e^{2x} \cos(2x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

6.

$$(a) \begin{cases} y'' - 2y' + 2y = x^3 + 1 \\ y(0) = 0, \quad y'(0) = 0 \end{cases}, \quad (b) \begin{cases} y'' - 2y' + 2y = x \cos(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$

$$(c) \begin{cases} y'' - 2y' + 2y = xe^{-x} \sin(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}, \quad (d) \begin{cases} y'' - 2y' + 2y = xe^x \sin(x) \\ y(0) = 0, \quad y'(0) = 0 \end{cases}.$$