

Risolvere i seguenti problema di Cauchy

$$1) \begin{cases} u'' + 2u' = 4x \\ u(0) = 1 \\ u'(0) = 0 \end{cases}$$

$$2) \begin{cases} u'' - u' = 2x \\ u(0) = 1 \\ u'(0) = 2 \end{cases} .$$

$$3) \begin{cases} u' + 3u = 6xe^{3x} \\ u(0) = -1 \end{cases}$$

$$4) \begin{cases} u' - 2u = 4xe^{-2x} \\ u(0) = 1 \end{cases}$$

$$5) \begin{cases} u'' + 6u' + 10u = e^{-2x} - 16 \\ u(0) = 0 \\ u'(0) = 1 \end{cases}$$

$$6) \begin{cases} u'' + 9u = x + e^{-x} \\ u(0) = 0 \\ u'(0) = 0 \end{cases}$$

$$7) \begin{cases} u'' - 2u' + 5u = 4e^{2x} \\ u(0) = 0 \\ u'(0) = 1 \end{cases}$$

$$8) \begin{cases} u'' + 4u = 8 \sin x \cos x \\ u(0) = 0 \\ u'(0) = 0 \end{cases}$$

$$9) \begin{cases} u'' + 6u' + 10u = e^{-2x} - 16 \\ u(0) = 0 \\ u'(0) = 1 \end{cases}$$

$$10) \begin{cases} u'' + 2u' - 8u = 9e^{-x} - 8x + 2 \\ u(0) = 1 \\ u'(0) = -1 \end{cases} .$$

$$11) \begin{cases} u'' + u' - 12u = 49e^{3x-1} \\ u(0) = -1 \\ u'(0) = 4 \end{cases}$$

$$12) \begin{cases} u' = u - (1 + 3x^2) u^2 \\ u(1) = -1 \end{cases}$$

$$13) \begin{cases} u' = \frac{x^2-4x-2}{(x-1)(x^2+4)}u \\ u(0) = 1 \end{cases}$$

$$14) \begin{cases} u' = u^2 + u \\ u(0) = 1 \end{cases}$$

$$15) \begin{cases} u' = \frac{u^2}{x^2+4} \\ u(0) = 1 \end{cases}$$

Determinare tutte le soluzioni delle seguenti equazioni differenziali

$$1) u' + \frac{e^u}{\sqrt{-x^2+2x}} = 0$$

$$2) u' + \frac{u^2}{\sqrt{4x-x^2}} = 0$$

$$3) u' - xu - \frac{x^3}{u} = 0$$

$$4) u' = \frac{u^2-2u-3}{4u-4}$$

$$5) u'' + 4u = 4 \cos 2x + 4x^2$$

$$6) u'' - u' - 2u = xe^x + 2x^2$$