$$\boxed{EDO} \rightleftarrows \boxed{SG}$$

ÚNICA.

$$\underbrace{F\Big(x, y(x), \frac{dy}{dx}\Big) = 0}_{\text{ECUACIÓN}}$$

derivada de la incógnita

incógnita

Var. indep.

$y = f(x)$

Solución

$\frac{dy}{dx}$

Sustituir en la EDO

$\underline{0 = 0}$

EDO.

ORDEN = 2

$$y = C_1 \cos(5x) + C_2 \operatorname{sen}(5x)$$

$$\frac{dy}{dx} = -5C_1 \operatorname{sen}(5x) + 5C_2 \cos(5x)$$

$$\frac{d^2y}{dx^2} = -25C_1 \cos(5x) - 25C_2 \operatorname{sen}(5x)$$

$$\frac{d^2y}{dx^2} = -25\left(C_1 \cos(5x) + C_2 \operatorname{sen}(5x)\right)$$

$$\frac{d^2y}{dx^2} = -25y \longrightarrow \boxed{\frac{d^2y}{dx^2} + 25y = 0}$$

$$\left[-25C_1 \cancel{\cos(5x)} - 25C_2 \cancel{\operatorname{sen}(5x)}\right] + 25\left[C_1 \cancel{\cos(5x)} + C_2 \cancel{\operatorname{sen}(5x)}\right] = 0$$

$$\underline{0 = 0}$$

$$\frac{d^2y}{dx^2} + 25y = 0 \qquad y(0) = 15$$

$$y'(0) = -10$$

$$y_g = C_1 \cos(5x) + C_2 \operatorname{sen}(5x)$$

para $x=0$ $\quad 15 = C_1 \cancel{\cos(0)}^{\,1} + C_2 \cancel{\operatorname{sen}(0)}^{\,0}$

$$C_1 = 15$$

$$\frac{dy}{dx} = -5C_1 \operatorname{sen}(5x) + 5C_2 \cos(5x)$$

para $x=0$ $\quad -10 = -5C_1 \cancel{\operatorname{sen}(0)}^{\,0} + 5C_2 \cancel{\cos(0)}^{\,1}$

$$-10 = 5C_2 \rightarrow C_2 = -2$$

$$\boxed{y_p = 15\cos(5x) - 2\operatorname{sen}(5x)}$$

Orden EDO $\Rightarrow$ cuantas constantes arbitrarias contiene la solución general $\Rightarrow$ Cuántas condiciones se requieren para obtener una solución particular orden 4 $$\frac{d^4 y}{dx^4} + a_1 \frac{d^2 y}{dx^2} + a_2 y = 0$$

$$y_g = c_1 y_1 + c_2 y_2 + c_3 y_3 + c_4 y_4$$

condiciones $y(0)$ $y'(0)$ $y''(0)$ $y'''(0)$.

$$y_p =$$

- EDO
  - LINEALES
    - SG única
    - SP ∞
  - NO-LINEALES
    - TIPO 1 -
      - SG única
      - SP ∞
    - TIPO 2 -
      - SG única
      - SP ∞
      - SS #

EDOL

$$a_0(x)\frac{d^n y}{dx^n} + a_1(x)\frac{d^{n-1} y}{dx^{n-1}} + \dots\dots + a_{n-1}(x)\frac{dy}{dx} + a_n(x)\,y = Q(x)$$

$$\frac{dy}{dx} + 2x\,y = 0$$

$a_0(x) = 1$

$a_1(x) = 2x$

$Q(x) = 0$

EDOL

$$\frac{d^2 y}{dx^2} + \cos(3x)\frac{dy}{dx} + \frac{y}{x} = 8e^{4x}$$

EDOL

$$\frac{dy}{dx} + y^2 = 4$$

EDONL

$$\frac{d^2\theta}{dt^2} + R_1 \operatorname{sen}(\theta) = 0$$

$\theta(t)$

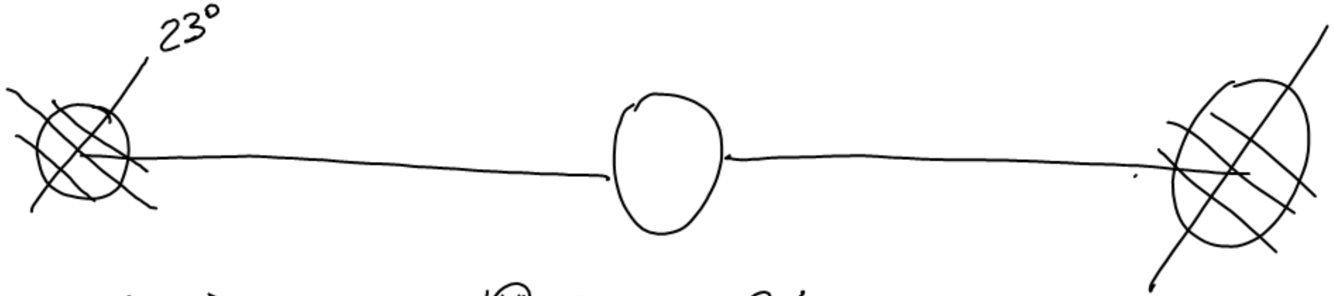
EDONL

θ rad.

$$\frac{d^2\theta}{dt^2} + R_1\theta = 0$$

$\operatorname{sen}(\theta) \doteq \theta$

$0 \leq \theta \leq 4^\circ$



LAT. — 19.326096

LONG — -99.183121

$$2y\left(\frac{dy}{dx}+2\right)-x\left(\frac{dy}{dx}\right)^2=0$$

EDO NL

$$y=\frac{(c_1-x)^2}{c_1}$$

$$\frac{dy}{dx}=\frac{-1}{c_1}\left(2(c_1-x)\right)$$

$$2\left[\frac{(c_1-x)^2}{c_1}\right]\left(-\frac{2(c_1-x)}{c_1}+2\right)-x\left(-\frac{2(c_1-x)}{c_1}\right)^2=0$$

$$-\frac{4}{c_1^2}(c_1-x)^3+\frac{4}{c_1}(c_1-x)^2-\frac{4x}{c_1^2}(c_1-x)^2=0$$

$$-\frac{4}{c_1^2}\left(c_1^3-3c_1^2x+3c_1x^2-x^3\right)+\frac{4}{c_1}\left(c_1^2-2c_1x+x^2\right)-\frac{4x}{c_1^2}\left(c_1^2-2c_1x+x^2\right)=0$$

$$-\cancel{4c_1}+\cancel{12x}-\cancel{\frac{12x^2}{c_1}}+\cancel{\frac{4x^3}{c_1^2}}+\cancel{4c_1}-\cancel{8x}+\cancel{\frac{4x^2}{c_1}}-\cancel{4x}+\cancel{\frac{8x^2}{c_1}}-\cancel{\frac{4x^3}{c_1^2}}=0$$

$$y_g=\frac{(c_1-x)^2}{c_1} \qquad 0=0$$

$$y=-4x$$

$$\frac{dy}{dx}=-4$$

$$2y\left(\frac{dy}{dx}+2\right)-x\left(\frac{dy}{dx}\right)^2=0$$

SINGULAR

$$2(-4x)\underbrace{(-4+2)}_{(-2)}-x(-4)^2=0$$

$$16x-16x=0$$

$$\boxed{0=0}$$