ED
- EDO
- EDenDP.

EDO
- PRIMER ORDEN
- ORDEN SUPERIOR (A UNO)

ED → E.M con forma Eq que contiene al menos una de las derivadas de una func. incógnita..

<u>Orden</u> EDO → está definido por el orden mayor

→ nos indica el # const. arbitra. asociadas a soluciones particulares fundamentales (lineal indep).

Solución General

$$EDO(n) \begin{cases} \text{LINEALES} \\ \\ \text{NO-LINEALES.} \end{cases}$$

$$\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + L(x)\,y - x^2\cos(3x) + \tan(x) = 0$$

EDO(2)

$$F\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}\right) = 0$$

1°

$$G\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}\right) = Q(x)$$

$$\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + L(x)\,y = -\tan(x) + x^2\cos(3x)$$

2° Si

$$G\left(x, (\lambda y), \frac{d(\lambda y)}{dx}, \frac{d^2(\lambda y)}{dx^2}\right) \Rightarrow \lambda^n \cdot G\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}\right),$$

entonces la EDO(n) Lineal.

EDO(n) L

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

$$\frac{d^2y}{dt^2}=-g \qquad \frac{dx}{dt}=0$$

$$\frac{d^2y}{dx^2}+9y=0 \qquad y=C_1\cos(3x)+C_2\operatorname{sen}(3x)$$

NO LINEAL

$$\left(\frac{dy}{dx}\right)^2 + y^3 = 0$$

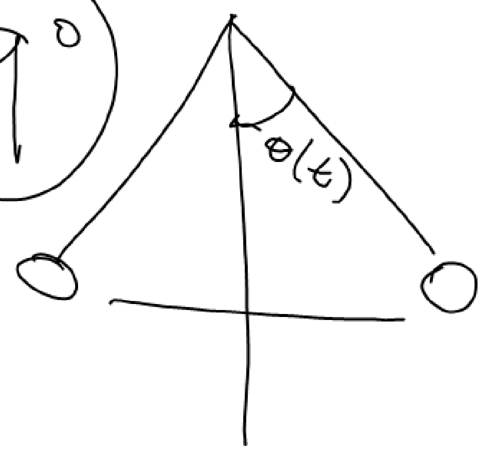
$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right) \cdot y = 0$$

$$\left(\frac{dy}{dx}\right) \cdot y = 5.$$

$$\frac{dy}{dx} = \frac{5}{y} \rightarrow \frac{dy}{dx} - \frac{5}{y} = 0$$

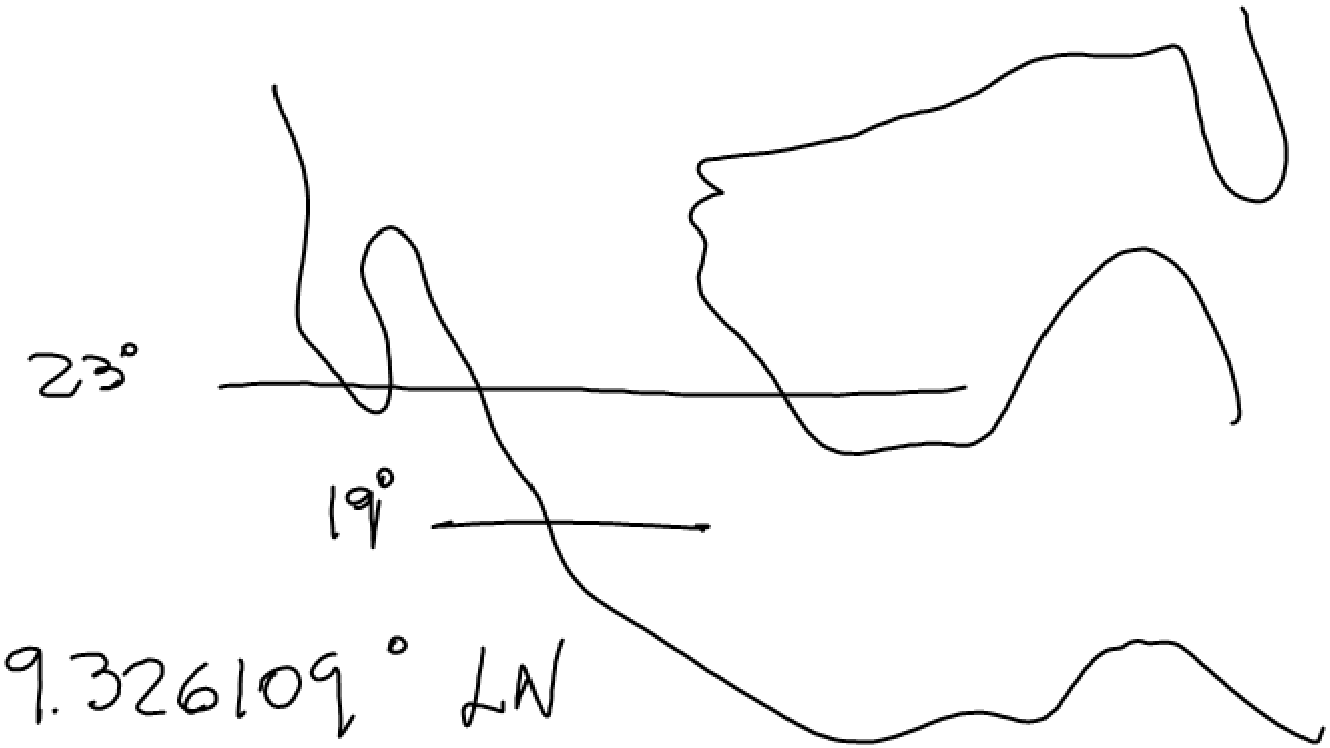
$$\frac{d^2\theta}{dt^2} + \omega \operatorname{sen}(\theta) = 0$$

$\theta \doteq \operatorname{sen}(\theta)$ 19°



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

$\theta \leq 4°$



19.326109° LN

-99.183228 LW.

2263.36 2288.89 precision 21.7 m.

EDO(n)

- LINEALES
  - coef.
    - C.V.
    - C.C
  - homg
    - No-hom
    - hom.
- NO LINEALES.

EDO(n)

- LIN. —
  - 1 SG
  - ∞ SP
- NO LIN.
  - CASO A
    - SG 1
    - SP ∞
  - CASO B
    - SG 1
    - SP ∞
    - SS #

SOLUCIONES SINGULARES

$$2y\,(y' + 2) - xy'^2 = 0.$$

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

EDO (1) NL

$$Cy - (C - x)^2 = 0,$$

SG $\quad y = \dfrac{(C_1 - x)^2}{C_1}$

$C_1 = 1$

$$y = \frac{(1-x)^2}{1} \quad SP$$

$C_1 = -2$

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

$$\boxed{y = -4x}$$

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

(SINGULAR)

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

$$16x - 16x = 0 \Rightarrow 0 \equiv 0$$

$$y = C_1 e^{-2x}$$ EDO(1)

$$\frac{dy}{dx} = -2C_1 e^{-2x}$$

$$C_1 = \frac{\frac{dy}{dx}}{-2e^{-2x}}$$

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

$$\downarrow$$

$$y = \frac{\frac{dy}{dx}}{-2}$$

$$-2y = \frac{dy}{dx}$$

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