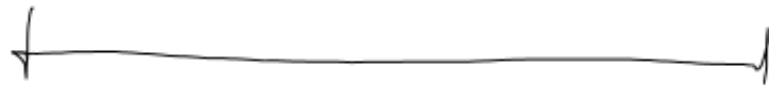


$$F(x, y(x), y'(x)) = 0$$



solución $y(x)$

$\in M$ que contiene
al menos una de las
derivadas de una función
desconocida llamada
incógnita.

+ Resolver una ED.

Encontrar la forma
de la incógnita que
satisface la ecuación

$$\frac{dy}{dx} = 0 \rightarrow y = C_1$$

$$\frac{dy}{dx} = y \rightarrow y = e^x$$

$$e^x = e^x \quad \frac{dy}{dx} = e^x$$

$$e^x - e^x = 0$$

$$0 \equiv 0$$

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

$$F(x, y, \frac{dy}{dx}) = 0$$

$$\frac{d^2 y}{dx^2} - y = 5x$$

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

EDO(2) NH.

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

EDO(2) H_(A)

$$F(x, y, \frac{dy}{dx}) = 0$$

$y(x)$ solución general

$$y(0) = 9$$

una y
sólo una

$y(0) = 9$ solución particular
infinito.

$$y = C_1 \cos(3x) + C_2 \sin(3x)$$

$$\frac{dy}{dx} = -3C_1 \sin(3x) + 3C_2 \cos(3x)$$

$$\frac{d^2 y}{dx^2} = -9C_1 \cos(3x) - 9C_2 \sin(3x)$$

$$= -9(C_1 \cos(3x) + C_2 \sin(3x))$$

$$\frac{d^2 y}{dx^2} = -9y \rightarrow \boxed{\frac{d^2 y}{dx^2} + 9y = 0}$$

$$y = C_1 \cos(3x) + C_2 \sin(3x)$$

$$y(0) = 4 \quad y(0) \Rightarrow 4 = C_1 \cos(3(0)) + C_2 \sin(3(0))$$

$$y'(0) = -6 \quad 4 = C_1(1) + C_2(0) \quad \boxed{C_1 = 4}$$

$$y' = -3C_1 \sin(3x) + 3C_2 \cos(3x)$$

$$y'(0) \Rightarrow -6 = -3(4)(0) + 3(C_2)(1)$$

$$-6 = 3C_2 \quad \boxed{C_2 = -2}$$

$$\underline{y_p = 4 \cos(3x) - 2 \sin(3x)}$$

$$F(x, y, y', y'', y''') = 0$$

$$y = c_1 y_1 + c_2 y_2 + c_3 y_3$$

$$y_p = y_1$$

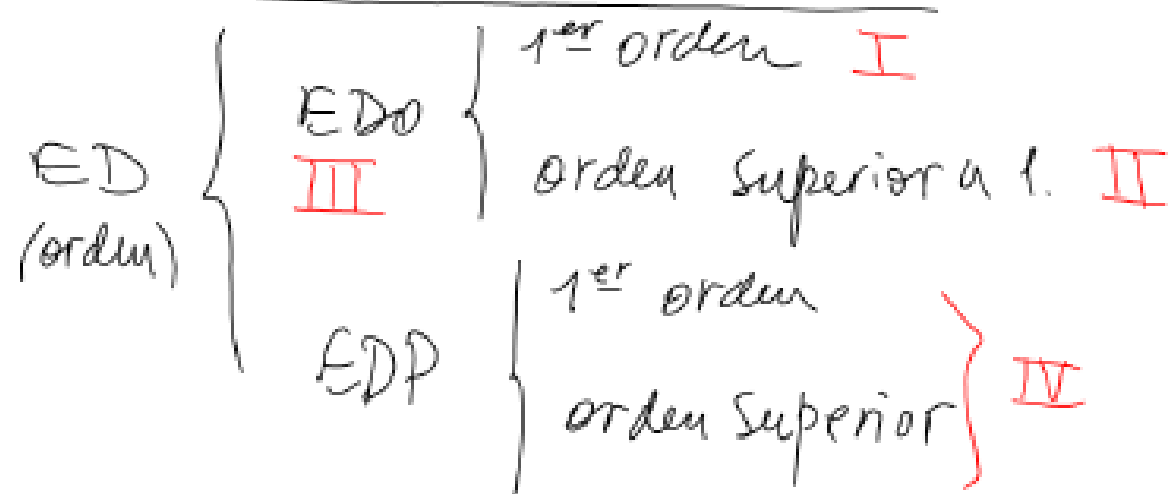
$$y_p = y_2$$

$$y_p = y_3$$

$$y_p = 3y_1 + 4y_2$$

Clasificación ED

$$\text{ED} \left\{ \begin{array}{ll} \text{EDO} & F\left(x, y, \frac{dy}{dx}\right) = 0 \\ \text{ordinarias} & y(x) \\ \text{I, II, III} & \\ \text{ED y DP} & F\left(x, y, z(x, y), \frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right) = 0 \\ \text{en derivadas} & \\ \text{parciales} & \\ \text{IV} & \end{array} \right.$$



	FAC.	VIDA REAL
EDO	80%	20%
EDendp.	20%	80%

EDO

$\left\{ \begin{array}{l} \text{1st order} \\ \text{order sep} \end{array} \right.$	$\left\{ \begin{array}{l} \text{lineares} \\ \text{No Lineares} \end{array} \right.$	$\left\{ \begin{array}{l} \text{Hom.} \\ \text{No Hom.} \end{array} \right.$	$\left\{ \begin{array}{l} \text{CV} \\ \text{CC} \end{array} \right.$	I.2
II	$\left\{ \begin{array}{l} \text{lineares} \\ \text{no Lineares} \end{array} \right.$	$\left\{ \begin{array}{l} \text{Hom.} \\ \text{No hom.} \end{array} \right.$	$\left\{ \begin{array}{l} \text{CV} \\ \text{CC} \end{array} \right.$	II

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

EDO(n) CV NH. 2.

$$\frac{dy}{dx} + \overset{\downarrow x^2} x y = \overset{\downarrow} 5x^2$$

EDO(1) CV NH Linear

$$a_0(x)=1 \quad a_1(x)=x^2 \quad Q(x)=5x^2$$

$$\frac{dy}{dx} + \frac{x^2}{y} = 5x^2$$

EDO(1) CV NH NL

$$x^2 \frac{dy}{dx} \cdot y = 5x^2$$

$$e^{-y} + \frac{dy}{dx} = 0 \quad \text{EDO(1) CV NH = NL}$$

$$\frac{dy}{dx} + x^2 \cos(y) = 5x^2$$

$$\text{EDO(1) CV NH. } \underline{NL}$$

$$\frac{d^2y}{dx^2} + \cos(5x) \frac{dy}{dx} + 4e^y y = 8x^2$$

$$\text{EDO(2) CV NH } \underline{L}$$

$$\sqrt{\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^3} + \sqrt{y} = 7x$$

ursularias.com/ECUACIONES. htm.

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

$$\frac{d^2 y}{dx^2} - 3y = -4x^2 \cos(3x)$$

$$a_0(x) \frac{d^2 y}{dx^2} + a_1(x) \frac{dy}{dx} + a_2(x) y = Q(x)$$

$$a_0(x) = 1 \quad a_1(x) = 0 \quad a_2(x) = -3 \quad Q(x) = -4x^2 \cos(3x)$$

EDO(z) \in C NH L.

$$y_{g/n-h} = y_{g/h_+} + y_{p/Q(x)}.$$