Clase 9 noviembre 2021.

$$e^{At} \longrightarrow [e^{At}]_{t=0} = I.$$

$$\frac{d}{dt} e^{At} = A e^{At}$$

$$\left[\frac{d}{dt} e^{At}\right]_{t=0} = A.$$

TEMA 3.

TEMA 4.- EDenDP

EDO $F(t, y(t), y', y'', \dots) = 0$

$y(t)$ incógnita

t variable independiente

tienen una y sólo un sol. gral.

EDenDP $F\left(x, y, z(x,y), \frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}, \frac{\partial^2 z}{\partial x^2}, \frac{\partial^2 z}{\partial y^2}, \frac{\partial^2 z}{\partial x \partial y}, \dots\right) = 0$

$z(x,y)$ incógnita

x, y var. indeps.

No tienen una solución general única

EDO $\left[\begin{array}{l} \dfrac{d^2y}{dt^2} + a_1 \dfrac{dy}{dt} + a_2 y = 0 \\ \text{orden} = 2 \end{array}\right.$ $\quad y_g = c_1 y_1 + c_2 y_2$

EDenDP $\left[\begin{array}{l} \dfrac{\partial^2 z}{\partial x^2} + a_1 \dfrac{\partial^2 z}{\partial y^2} = 0 \\ \text{orden} = 2 \end{array}\right.$ $\quad z_g = F_1(x,y) + F_2(x,y)$

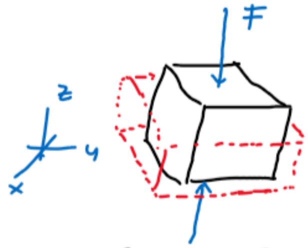
EDO $\left\{\begin{array}{l} \text{LINEALES} \\ \text{NO LINEALES} \end{array}\right.$

EDenDP $\left\{\begin{array}{l} \text{LINEALES} \to \dfrac{\partial F}{\partial x} + \dfrac{\partial F}{\partial y} = F \\ \text{CUASI-LINEALES} \\ \text{NO LINEALES} \to \left(\dfrac{\partial F}{\partial x}\right)^2 + \dfrac{\partial F}{\partial y} = F \end{array}\right.$

EDenDP $-\left\{\begin{array}{l} \text{condiciones iniciales} \\ \text{condiciones frontera} \\ \text{ci + cf.} \end{array}\right.$

CUASI LINEAL $\to \dfrac{\partial F}{\partial x} + \dfrac{\partial F}{\partial y} = F^2$

MECÁNICA DEL MEDIO CONTINUO

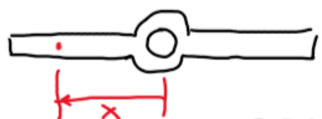


$z(x,y)$

Fuerza de Compresión

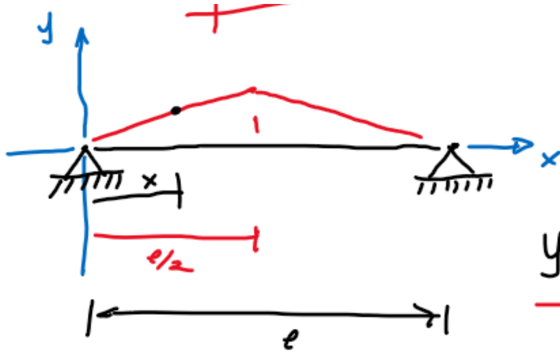
$$\frac{\partial^2 z}{\partial x^2} + a_1 \frac{\partial^2 z}{\partial y^2} = 0 \qquad a_1 = f(F)$$

TERMODINÁMICA.



$T(x,t)$

$$\frac{\partial T}{\partial x} + a_1 \frac{\partial^2 T}{\partial t^2} = 0 \qquad a_1$$



$y(x,t)$

$$\frac{\partial^2 y}{\partial x^2} + A \frac{\partial^2 y}{\partial t^2} = 0$$

	CURSO	REALES
EDO	80%	20%
EDenD?	20%	80%

$$\frac{\partial^2 F}{\partial x^2} + 5\frac{\partial^2 F}{\partial x \partial y} + 6\frac{\partial^2 F}{\partial y^2} = 0 \qquad \text{EDenDPL}(2)\,H.$$

$$f(y+ax) \Rightarrow f(u) \quad u = y+ax$$

$$\frac{\partial F}{\partial x} = f'(u)\cdot\frac{\partial u}{\partial x} \Rightarrow a\cdot f' \qquad \frac{\partial^2 F}{\partial x^2} \Rightarrow a^2 f''$$

$$\frac{\partial^2 F}{\partial x \partial y} \Rightarrow a f''$$

$$\frac{\partial F}{\partial y} = f'(u)\cdot\frac{\partial u}{\partial y} \Rightarrow f' \qquad \frac{\partial^2 F}{\partial y^2} \Rightarrow f''$$

$$(a^2 f'') + 5(af'') + 6(f'') = 0$$

$$(a^2 + 5a + 6)f'' = 0 \qquad \begin{cases} a^2 + 5a + 6 \\ f'' = 0 \end{cases}$$

$$f''(y+ax) = 0 \qquad f'(y+ax) = c_1 \qquad f(y+ax) = c_1(y+ax) + c_2$$

trivial e inútil

$$a^2 + 5a + 6 = 0$$

$$(a+3)(a+2) = 0$$

$$a_1 = -3$$

$$a_2 = -2$$

$$\boxed{F(x,y) = f_1(y-3x) + f_2(y-2x)}$$

$$\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = 0$$

$z(x,y) = f(y+ax) \longrightarrow f(u) \quad u = y + ax$

$$\frac{\partial z}{\partial x} = af' \qquad \frac{\partial z}{\partial y} = f'$$

$$\frac{\partial^2 z}{\partial x^2} = a^2 f'' \qquad \frac{\partial^2 z}{\partial y^2} = f''$$

$$\frac{\partial^2 z}{\partial x \partial y} = af''$$

$$(a^2 f'') - 2(af'') + (f'') = 0$$

$(a^2 - 2a + 1) f'' = 0 \qquad f'' -$ trivial

$$(a^2 - 2a + 1) = 0$$

$(a-1)^2 = 0 \qquad a_1 = a_2 = 1$

$$\left[\begin{array}{ll} z(x,y) = f_1(y+x) + f_2(y+x)\cdot x & \text{SOLGRAL} \\ z(x,y) = f_1(y+x) + f_2(y+x)\cdot y & \text{SOLGRAL} \end{array}\right.$$

TEMA 4.- "Un muy breve introducción a las ecuaciones diferenciales en derivadas parciales."

Jueves 11.

+ Método General. separación de variables.

$$z(x,y) = F(x)\cdot G(y)$$

+ Serie trigonométrica de FOURIER para soluciones particulares.