Capítulo V:

+ La Ecuación Diferencial en Derivadas Parciales

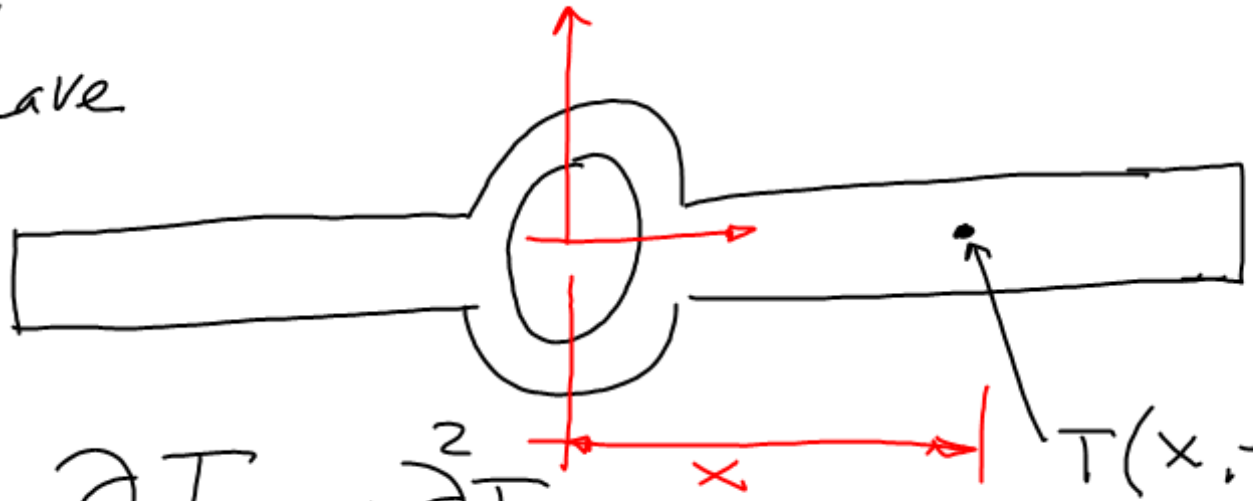
$$\mp\left(x, y, z, \frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}, \frac{\partial^2 z}{\partial x^2}, \ldots\right) = 0$$

incógnita

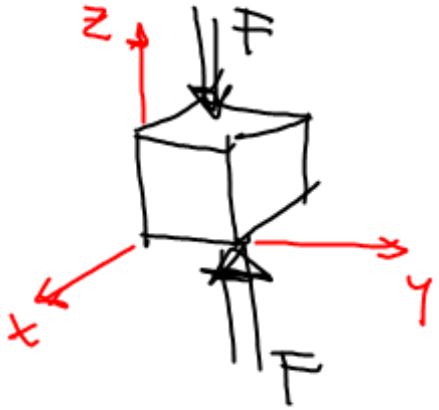
$z(x, y)$

Variables independientes.

Álave



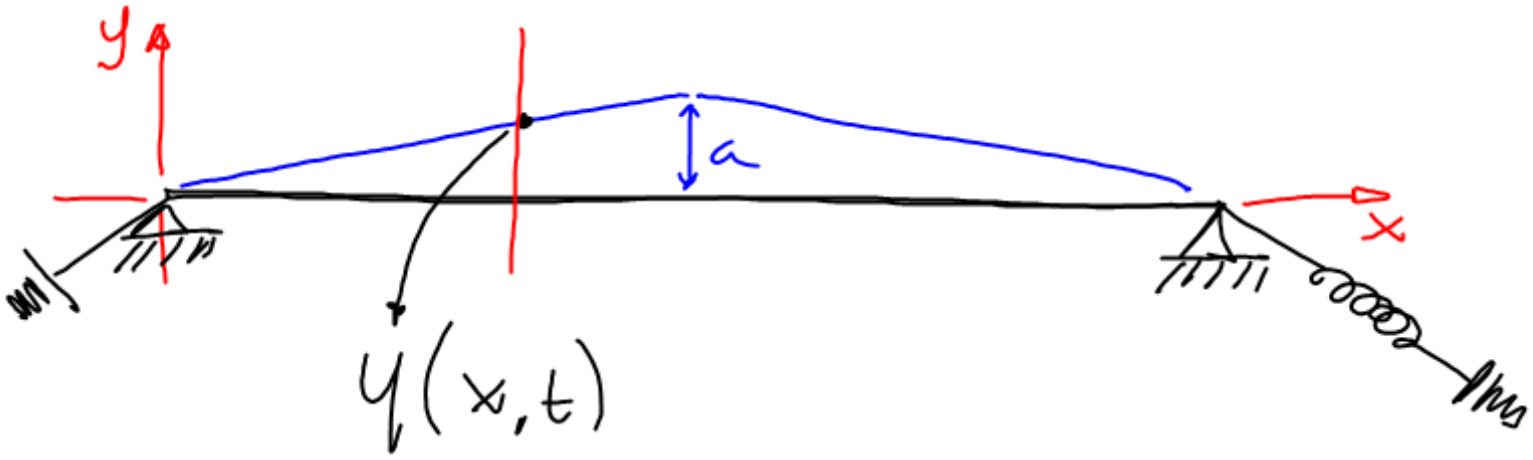
$$\frac{\partial T}{\partial t} = k\frac{\partial^2 T}{\partial x^2}$$



$$z(x,y)$$

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

Cuerda (flexible) de guitarra



$$\frac{\partial^2 y}{\partial x^2} = k^2 \frac{\partial^2 y}{\partial t^2}$$

	Met. Sol.	Ingen.
EDO	80%	20%
EDeDP	20%	80%

$z(x,y)$

$$\frac{\partial^2 z}{\partial x^2} - 5\frac{\partial^2 z}{\partial x \partial y} + 6\frac{\partial^2 z}{\partial y^2} = 0$$

H: $z(x,y) \Rightarrow z(u) \longrightarrow u = mx + y$

$$\frac{\partial z}{\partial x} = \frac{dz}{du}\cdot\frac{\partial u}{\partial x} \Rightarrow z'\cdot(m) \Rightarrow m z'$$

$$\frac{\partial z}{\partial y} = \frac{dz}{du}\cdot\frac{\partial u}{\partial y} \Rightarrow z'\cdot(1) \Rightarrow z'$$

$$\frac{\partial^2 z}{\partial x^2} = z''\cdot(m)\cdot(m) \Rightarrow m^2 z''$$

$$\frac{\partial^2 z}{\partial y^2} = z''\cdot(1)\cdot(1) \Rightarrow z''$$

$$\frac{\partial^2 z}{\partial x \partial y} = z''\cdot(m)\cdot(1) = m z''$$

$$m^2 z'' - 5m z'' + 6z'' = 0$$

$$(m^2 - 5m + 6)\, z'' = 0$$

$$\begin{cases} m^2 - 5m + 6 = 0 \longrightarrow \begin{cases} m_1 = 3 \\ m_2 = 2 \end{cases} \\ z'' = 0 \quad z' = k_1 \quad z = k_1 u + k_2 \end{cases}$$

$$z = k_1(mx+y) + k_2$$

TRIVIAL

$f_1(3x+y) \qquad f_2(2x+y)$

$$z(x,y) = f_1(3x+y) + f_2(2x+y)$$

$$z_p = 4e^{(3x+y)} + 6L(2x+y)$$