

2° PARCIAL : Tema 3 & 4.

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- Sin computadora: Jueves 22 J205A.

Serie 4 → Publicar 6 MAYO -  
ENTREGAR EL 12 MAYO 23.59 H.

Tema II. - ED en DP

$$\left. \begin{array}{ccc} \frac{\partial z}{\partial x} & \frac{\partial z}{\partial y} & \\ \frac{\partial^2 z}{\partial x^2} & \frac{\partial^2 z}{\partial x \partial y} & \frac{\partial^2 z}{\partial y^2} \end{array} \right\} f(x, y)$$

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

II.  $z(x, y) = f(y + mx)$

$$z(x, y) = f_1(y + m_1 x) + f_2(y + m_2 x) \quad m_1 \neq m_2$$

$$\frac{\partial z}{\partial x} = m f'(y + mx) \quad \frac{\partial z}{\partial y} = f'(y + mx)$$

$$\frac{\partial^2 z}{\partial x^2} = m^2 f''(y + mx)$$

$$\frac{\partial^2 z}{\partial x \partial y} = m f''(y + mx)$$

$$\frac{\partial^2 z}{\partial y^2} = f''(y + mx)$$

$$m^2 f''(y + mx) - 5 m f''(y + mx) + 6 f''(y + mx) = 0$$

$$(m^2 - 5m + 6) \cdot f''(y + mx) = 0$$

$$m^2 - 5m + 6 = 0 \quad m_1 = 2$$

$$(m - 2)(m - 3) = 0 \quad m_2 = 3$$

Sol.  
trivial

$$\left. \begin{array}{l} f'' = 0 \\ f' = k_1 \\ f = k_1(y + mx) + k_2 \end{array} \right\}$$

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

## MÉTODO DE SEPARACIÓN DE VARIABLES

$$\frac{\partial^2 z(x, y)}{\partial y^2} + 4 \frac{\partial z(x, y)}{\partial x} = z(x, y)$$

$$H_0 \quad z(x, y) = F(x) * G(y)$$

$$\frac{\partial z}{\partial x} = F'(x) * G(y) \quad \frac{\partial z}{\partial y} = F(x) * G'(y)$$

$$\frac{\partial^2 z}{\partial y^2} = F(x) * G''(y)$$

$$\text{E.DenD} \Rightarrow F(x) * G''(y) + 4F'(x) * G(y) = F(x) * G(y)$$

$$F(x) * G''(y) = -4F'(x) * G(y) + F(x) * G(y)$$

$$\frac{F(x) * G''(y)}{F(x) * G(y)} = \frac{(-4F'(x) + F(x)) * G(y)}{F(x) * G(y)}$$

$$\frac{G''(y)}{G(y)} = \frac{-4F'(x) + F(x)}{F(x)}$$

$$\int \frac{d^2 G(y)}{G(y)} = \alpha \quad \int \frac{-4dF(x)}{F(x)} + 1 = \alpha$$

E.D(2)L                      E.D(1)L

$$\frac{\partial y(x,t)}{\partial x} + \frac{\partial^2 y(x,t)}{\partial x \partial t} - \frac{\partial y(x,t)}{\partial t} = 0$$

$$y(x,t) = P(x) \cdot Q(t)$$

$$\frac{\partial y}{\partial x} = P'(x) \cdot Q(t) \quad \frac{\partial y}{\partial t} = P(x) \cdot Q'(t)$$

$$\frac{\partial^2 y}{\partial x \partial t} = P'(x) \cdot Q'(t)$$

$$P'(x) \cdot Q(t) + P'(x) \cdot Q'(t) - P(x) \cdot Q'(t) = 0$$

$$P'(x) [Q(t) + Q'(t)] = P(x) Q'(t)$$

$$\frac{P'(x)}{P(x)} = \frac{Q'(t)}{Q(t) + Q'(t)}$$