EXÁMENES FINALES COLEGIADOS.

1ª vuelta: VIERNES 8 DIC. 13:00 a 16.00
SALONES J205A & J204

2ª vuelta: VIERNES 15 DIC. 11:30 a 14.30
SALÓN J205A

SE PODRÁ RESOLVER EN MAPLE Y/O MANO
DEBERÁ RESPONDERSE COMPLETO.

TEMA 4. ECS. EN DERIVADAS PARCIALES.

	TEMARIO	REAL
EDO.	80%	20%
EDP	20%	80%

1er MÉTODO: EDP / CON TÉRMINOS DEL MISMO ORDEN.

$$\frac{\partial^2 z}{\partial x^2} - 6\frac{\partial^2 z}{\partial x \partial y} + 8\frac{\partial^2 z}{\partial y^2} = 0$$

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

$$\frac{\partial z}{\partial x} = mf' \qquad \frac{\partial^2 z}{\partial x^2} = m^2 f''$$

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

$$\left[m^2 f''\right] - 6\left[mf''\right] + 8f'' = 0$$

$$(m^2 - 6m + 8)f'' = 0 \qquad f'' = 0 \quad f' = C_1 \quad f = C_1(y+mx) + C_2$$

$$m^2 - 6m + 8 = 0 \qquad (m-2)(m-4) = 0 \qquad m_1 = 2 \quad m_2 = 4$$

$$z(x,y) = f_1(y+2x) + f_2(y+4x)$$

2° Método: Variables Separables

$$\frac{\partial^2 z}{\partial y^2} - 6\frac{\partial^2 z}{\partial x \partial y} + 8\frac{\partial z}{\partial x} = z$$

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

$\frac{\partial z}{\partial y} = F\cdot G' \quad \frac{\partial^2 z}{\partial y^2} = F\cdot G''$

$\frac{\partial^2 z}{\partial x \partial y} = F'\cdot G' \quad \frac{\partial z}{\partial x} = F'\cdot G$

$F\cdot G'' - 6F'\cdot G' + 8F'G = FG$

$F\cdot G'' - FG = 6F'G' - 8F'G$

$F(G'' - G) = F'(6G' - 8G)$

$\frac{G'' - G}{6G' - 8G} = \frac{F'}{F}$

$H_1 = F(x) + G(y)$

$\frac{F'}{F} = \alpha \quad \frac{G'' - G}{6G' - 8G} = \alpha$

$\alpha = 0 \quad F' = 0 \;\Big|\; F(x) = C_1$

$G'' - G = 0 \;\Big|\; G(y) = k_1 e^{-y} + k_2 e^{y}$

$m^2 - 1 = 0$

$m = \pm 1$

para $\alpha = 0 \quad z(x,y) = G(k_1 e^{-y} + k_2 e^{y})$

$$\underset{\alpha=0}{z(x,y)} = k_{10} e^{-y} + k_{20} e^{y}$$

para $\alpha > 0$ $\alpha = \beta^2$ $\forall \beta \neq 0 \in \mathbb{R}$

$$\frac{F'}{F} = \beta^2 \qquad F' - \beta^2 F = 0$$

$$m - \beta^2 = 0 \qquad m = \beta^2$$

$$F(x) = G e^{\beta^2 x}$$

$$\frac{G'' - G}{6G' - 8G} = \beta^2$$

$$G'' - G = \beta^2 (6G' - 8G)$$

$$G'' - 6\beta^2 G' + (8\beta^2 - 1) G = 0$$

$$m^2 - 6\beta^2 m + (8\beta^2 - 1) = 0$$

$$m_{1,2} = \frac{6\beta^2 \pm \sqrt{36\beta^4 - 4(8\beta^2 - 1)}}{2}$$

$$m_{1,2} = \frac{6\beta^2 \pm \sqrt{36\beta^4 - 32\beta^2 + 4}}{2}$$

$$m_1 = 3\beta^2 + \sqrt{9\beta^2 - 8}$$