

EXÁMENES PARCIALES

1º EXAMEN
COLEGIADO

TEMA I.

SAB 31/8
9 a 11

J205A - EQ
J205B - LAPLACE

2º EXAMEN
COLEGIADO

TEMA II
TEMA III - SIST.
ED.

SAB 19/10
10:30 A 12:30

✓✓
✓✓

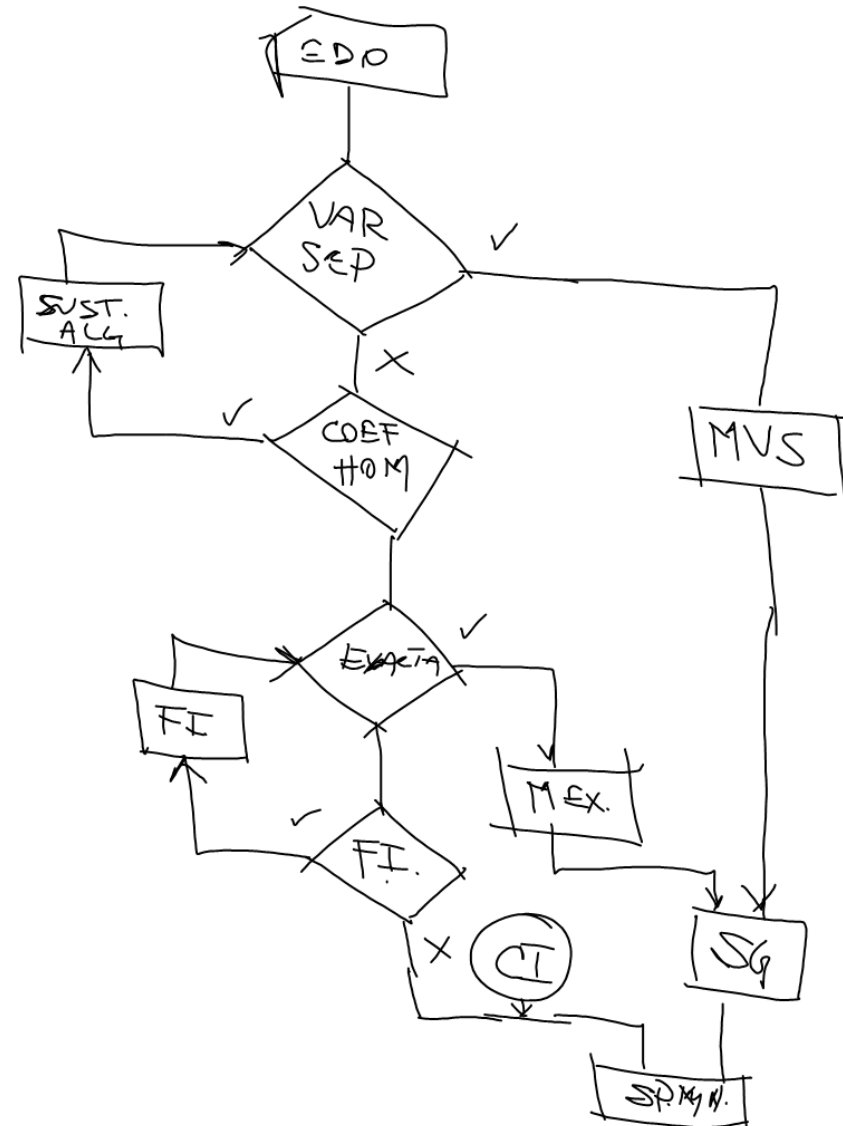
3º EXAMEN
PROFESOR

TEMA III - Laplace
TEMA IV

JUEVES 21/11
11:00 - 13:00

ECUACIONES DIFERENCIALES PRIMER ORDEN NO LINEALES

$$M(x, y) + N(x, y) \frac{dy}{dx} = 0$$



MÉTODO SEPARACIÓN VARIABLES
EDO(1) NL.

$$M(x, y) + N(x, y) \frac{dy}{dx} = 0$$

$$P(x) \cdot Q(y) + R(x) \cdot S(y) \frac{dy}{dx} = 0$$

$$\text{SG} \Rightarrow \frac{P(x)}{R(x)} dx + \frac{S(y)}{Q(y)} dy = 0$$

Sol
GRAL

$$\int \frac{P(x)}{R(x)} dx + \int \frac{S(y)}{Q(y)} dy = C_1$$

$$F(x, y) = C_1$$

$$(1+y^2) - x \frac{dy}{dx} = 0 \Rightarrow \boxed{\frac{dy}{dx} = \frac{1+y^2}{x}}$$

$$M(x,y) = (1+y^2) \Rightarrow P(x) = 1 \quad Q(y) = 1+y^2$$

$$N(x,y) = -x \Rightarrow R(x) = -x \quad S(y) = 1$$

$$\int \frac{P(x)}{R(x)} dx + \int \frac{S(y)}{Q(y)} dy = C,$$

$$\int \frac{dx}{-x} + \int \frac{dy}{1+y^2} = C,$$

$$\boxed{-\ln x + \arctan(y) = C,}$$

SOLUCIÓN
GENERAL

$$M(x, y) + N(x, y) \frac{dy}{dx} = 0$$

Coef. hom.

$$M(\lambda x, \lambda y) = \lambda^m \cdot M(x, y)$$

$$N(\lambda x, \lambda y) = \lambda^n \cdot N(x, y)$$

$$m = n$$

Subst. $y(x) = u(x) \cdot x$ $y'(x) = u'(x) \cdot x + u(x)$

Variables separables

$$\frac{dy}{dx} = \frac{2xy}{3x^2 - y^2}$$

$$(3x^2 - y^2) \frac{dy}{dx} = 2xy$$

$$-2xy + (3x^2 - y^2) \frac{dy}{dx} = 0$$

$$M(x, y) = -2xy$$

$$N(x, y) = 3x^2 - y^2$$

$$M(\lambda x, \lambda y) = -2(\lambda x)(\lambda y) \Rightarrow \lambda^2 [-2xy] \quad m=2$$

$$N(\lambda x, \lambda y) = 3(\lambda x)^2 - (\lambda y)^2 \Rightarrow \lambda^2 (3x^2 - y^2) \quad n=2 \quad m=n$$

$$y = ux$$

$$y'(x) = u(x) \cdot x. \quad y'(x) = u'(x)x + u(x)$$

$$-2x(u(x)x) + (3x^2 - (u(x)x)^2)(u'(x)x + u(x)) = 0$$

$$-2x^2 u(x) + (3x^2 - u^2(x)x^2)(u'(x)x) + (3x^2 - u^2(x)x^2)u(x) = 0$$

$$-2x^2 u(x) + (3x^3 - u^2(x)x^3)u'(x) + (3x^2 u(x) - u^2(x)x^2) = 0$$

$$(-2x^2 u(x) + 3xu(x) - u^2(x)x^2) + (3x^3 - u^2(x)x^3)u'(x) = 0$$