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EDO - Capítulo 7

19) $x^2y^3 + (1+y^2)xy' = 0$ $\quad \mu(x,y) = \frac{1}{xy^3}$

$M = x^2y^3 \quad M_y = 3x^2y^2$

$N = x + y^2x \quad N_x = 1 + y^2$

$\frac{x^2y^3}{xy^3} + \frac{(x + y^2x)y'}{xy^3} \qquad \frac{x}{x}$

$M = x \quad M_y = 1$

$N = \frac{x}{xy^3} + \frac{y^2x}{xy^3} \quad N_x = 1$

$\psi(x,y) = \frac{x^2}{2} + hy \quad . \quad h'y = \frac{1}{y^3} + \frac{1}{y}$

$\psi(x,y) = \frac{x^2}{2} + \frac{1}{y^3} + \frac{1}{y} = C$ //

20) $\left(\frac{\operatorname{sen} y}{y} - 2e^{-x}\operatorname{sen} x\right)dx + \left(\frac{\cos y}{y} + 2e^{-x}\cos x\right)dy$

$\mu(x,y) = ye^x$

$M_y = y\cos y - y^2\operatorname{sen} y \quad N_x = -2e^{-x}(\cos x + \operatorname{sen} x)$

$(e^x\operatorname{sen} y - 2y\operatorname{sen} x)dx + (e^x\cos y + 2\cos x)dy = 0$

$\int e^x\cos y + 2\cos x\,dy = \psi(x,y)$

$\psi = e^x\operatorname{sen} y - 2y\cos x + h(x) = M \Rightarrow h'(x) = 0$

$e^x\operatorname{sen} y + 2\cos x\,dy = C$ //

21) $y\,dx + (2x - ye^y)\,dy = 0 \quad \mu(x,y) = y$

$M = y \qquad My = 1$

$N = 2x - ye^y \qquad Nx = 2$

$y^2 + (2xy - y^2e^y)$

$M = y^2 \qquad My = 2y$

$N = 2xy - y^2e^y \qquad Nx = 2y$

$\psi(x,y) = \int y^2\,dx = y^2x + h(y)$

$\psi(x,y)y = 2xy + h'y = 2x - ye^y$

$h(y) = 2xy + 2x - ye^y$

$h(y) = y^2x + 2xy - ye^y - e^y + y^2x$

$c = 2xy - ye^y - e^y$

22) $(x+2)\operatorname{sen} y\,dx + x\cos y\,dy = 0 \quad y(x,y) = y$

$M = (x+2)\operatorname{sen} y \qquad My = \cos yx + 2\cos y$

$N = x\cos y \qquad Nx = \cos y$

$(yx + 2y)\,y\operatorname{sen} y + yx\cos y\,y'$

$My = Nx$