Tarea 2 Punto 4 Ec. Riccati

$x^3 y' = x^4 y^2 - 2x^2 y - 1$ Sln particular $y_1 = x^{-2}$ $y_1' = -2x^{-3}$

$x^3(-2x^{-3} - u^{-2}u') = x^4(x^{-2}+u^{-1})^2 - 2x^2(x^{-2}+u^{-1}) - 1$ Sostitución $y = y_1 + u^{-1}$

$-2 - x^3 u^{-2} u' = x^4(x^{-4} + 2x^{-2}u^{-1} + u^{-2}) - 2 - 2x^2 u^{-1} - 1$ $y' = y_1' - u^{-2}u'$

$x^3 u^{-2} u' = 1 + 2x^2 u^{-1} + x^4 u^{-2} - 2x^2 u^{-1} - 1$ $y' = -2x^{-3} - u^{-2}u'$

$-x^3 u^{-2} u' = x^4 u^{-2}$

$u' = -x$

$\int du = -\int x\,dx$

$u = -\frac{x^2}{2} + C \Rightarrow y = x^{-2} + \left(-\frac{x^2}{2} + C\right)^{-1} \Rightarrow y = \frac{1}{x^2} + \frac{2}{2C - x^2}$