15.06

fredag 23 december 2022 13:46

$$y' - \frac{x}{1+x^2} y = \frac{x}{1+x^2}$$

$$g(x) = -\frac{x}{1+x^2} \qquad G(x) = -\tfrac{1}{2}\ln(1+x^2) \cdot \frac{1}{2} \qquad IF = e^{-\frac{1}{2}\ln(1+x^2)} = \frac{1}{\sqrt{1+x^2}}$$

$$y \cdot e^{-\frac{1}{2}\ln(1+x^2)} = \int \frac{x}{1+x^2} \cdot e^{-\frac{1}{2}\ln(1+x^2)} dx = \int \frac{x}{(1+x^2)^{3/2}} dx =$$

$$= -e^{-\frac{1}{2}\ln(1+x^2)} + C$$

$$y = -1 + C\sqrt{1+x^2}$$

$$y(0) = -1 + C\sqrt{1} = 2 \qquad C = 3 \qquad y(0) = -1 + \frac{3}{1} = 2$$

Sv: $-1 + 3\sqrt{1+x^2}$