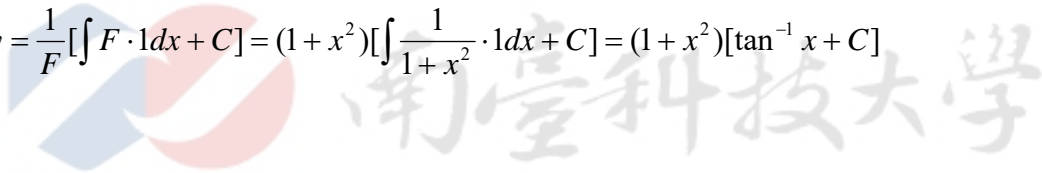


Find the solution of the equation $(1+x^2)(dy-dx)=2xydx$ for which $y=1$ when $x=0$. [99 高師大電子 1]

$$[\text{解}] \text{原式} \Rightarrow dy - dx = \frac{2xy}{1+x^2} dx \Rightarrow y' - 1 = \frac{2xy}{1+x^2} \Rightarrow y' - \frac{2x}{1+x^2} y = 1$$

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

$$y = \frac{1}{F} \left[\int F \cdot 1 dx + C \right] = (1+x^2) \left[\int \frac{1}{1+x^2} \cdot 1 dx + C \right] = (1+x^2) [\tan^{-1} x + C]$$



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