

解微分方程式 $(1+x^2)(1+y^2)dx - xydy = 0$ 。[103 高第一機械 3]

$$[\text{解}] \text{原式} \Rightarrow \frac{(1+x^2)dx}{x} - \frac{ydy}{(1+y^2)} = 0 \Rightarrow \int \frac{(1+x^2)dx}{x} - \int \frac{ydy}{(1+y^2)} = C$$

$$\int \frac{(1+x^2)dx}{x} - \frac{1}{2} \int \frac{d(1+y^2)}{(1+y^2)} = C \Rightarrow \ln x + \frac{x^2}{2} - \frac{1}{2} \ln(1+y^2) = C$$

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



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