

Solve the differential equation $\frac{d^2y}{dx^2} + (\tan x)\frac{dy}{dx} = 0$. [105 成大環工 IC]

[解] 令 $u = \frac{dy}{dx}$, 則原式 $\Rightarrow \frac{du}{dx} + (\tan x)u = 0 \Rightarrow \frac{du}{u} + \tan x dx = 0 \Rightarrow \int \frac{du}{u} + \int \tan x dx = k$

$$\ln u + \ln \sec x = k \Rightarrow \ln(u \sec x) = k \Rightarrow u \sec x = C_1 \Rightarrow \frac{dy}{dx} \sec x = C_1 \Rightarrow dy = C_1 \cos x dx$$

$$\int dy = \int C_1 \cos x dx + C_2 \Rightarrow y = C_1 \sin x + C_2$$



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