

求解起始值問題 $\frac{dy}{dx} = \frac{y}{x^2 - 3x + 2}$; $y(0) = 2$. [101 屏科大機械 1]

[解]原式 $\Rightarrow \frac{dy}{y} = \frac{dx}{x^2 - 3x + 2} \Rightarrow \frac{dy}{y} = \frac{dx}{(x-2)(x-1)} \Rightarrow \int \frac{dy}{y} = \int \frac{dx}{(x-2)(x-1)} + k$

$$\int \frac{dy}{y} = \int \left(\frac{1}{x-2} - \frac{1}{x-1} \right) dx + k \Rightarrow \ln y = \ln(x-2) - \ln(x-1) = k \Rightarrow \ln \frac{y(x-1)}{x-2} = k$$

$$\frac{y(x-1)}{x-2} = C$$

$$y(0) = 2 \Rightarrow \frac{2(0-1)}{0-2} = C \Rightarrow C = 1$$

$$\text{解為 } \frac{y(x-1)}{x-2} = 1 \Rightarrow y(x-1) = x-2$$

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