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Related Problems on Linear Differential Equation

SUBJECT : Mathematics
CHAPTER NUMBER: 09
CHAPTER NAME : Differential Equations

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Example

Find the integrating factor of the differential equation $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}}\right)\frac{dx}{dy} = 1.$

Example

Find the order and degree of the following differential equations

1. $\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{dy}{dx}\right) = 0.$

2. $\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right)^2 + \sin\left(\frac{dy}{dx}\right) + 1 = 0.$

Example

Solve the differential equation $(\tan^{-1} y - x)dy = (1 + y^2)\, dx$.

Example

Find the particular solution of the differential equation $\frac{dy}{dx} + y\,cotx = 2x + x^2\,cotx\,, x \neq 0$

given that $y = 0$ when $x = \frac{\pi}{2}$.

Example

Solve the differential equation $y\, e^{\frac{x}{y}}\, dx = \left(x\, e^{\frac{x}{y}} + y^2\right) dy\ (y \neq 0)$.

Example

Find the general solution of $x \log x \ \frac{dy}{dx} + y = \frac{2}{x} \ logx$.

Example

Find the equation of a curve passing through the origin given that the slope of the tangent to the curve at any point (x, y) is equal to the sum of the coordinates of the point.

Example

Find a particular solution of the differential equation $(x-y)(dx+dy)=dx-dy$ given that $y=-1$, when $x=0$.

Example

The population of a village increases continuously at a rate proportional to the number of its inhabitants present at any time. If the population of the village was 20,000 in 1999 and 25,000 in the year 2004, what will be the population of the village in 2009?

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