

↳ Find the differential equation of the family of curves $y = Ae^{2x} + B.e^{-2x}$

Solution: $y = Ae^{2x} + B.e^{-2x}$

$$\frac{dy}{dx} = 2Ae^{2x} - 2B.e^{-2x} \quad \text{and} \quad \frac{d^2y}{dx^2} = 4Ae^{2x} + 4B.e^{-2x}$$

Thus $\frac{d^2y}{dx^2} = 4y$ i.e., $\frac{d^2y}{dx^2} - 4y = 0$