Applied Mathematics 2A

APM02A2 **Tutorial 07**

---

1. Solve the following differential equations.
   (a) $y'' - 3y' + 2y = 0$
   (b) $y'' - 8y' + 20y = 100x^2 - 26xe^x$
   (c) $y'' + 4y' - y = 0$
   (d) $y'' - 4y = (x^2 - 3)\sin(2x)$

2. Solve the following initial-value problems.
   (a) $\dfrac{d^2y}{d\theta^2} + y = 0,\ y(\pi/3) = 0,\ y'(\pi/3) = 2$
   (b) $2y'' + 3y' - 2y = 14x^2 - 4x - 11,\ y(0) = 0,\ y'(0) = 0$
   (c) $\dfrac{d^2x}{dt^2} + \omega^2 x = F_0\cos(\gamma t),\ x(0) = 0, x'(0) = 0$
   (d) $y''' + 2y'' - 5y' - y = 0,\ y(0) = y'(0) = 0,\ y''(0) = 1$

3. Find the general solution of $2y''' + y'' + 4y' - 4y = 0$ if $m_1 = \frac{1}{2}$ is one root of its auxiliary equation.

4. Discuss how we could use the method of undetermined coefficients to find a particular solution of $y'' + y = \sin(x)\cos(2x)$. Implement your idea.