

Homogeneous Linear Equations

1. Find the general solutions of the following second-order differential equations.

(a) $4y'' + y' = 0$

(b) $y'' - y' - 6y = 0$

(c) $12y'' - 5y' - 2y = 0$

2. Solve the given initial-value problem.

$$\frac{d^2y}{dt^2} - 4\frac{dy}{dt} - 5y = 0, \quad y(1) = 0, \quad y'(1) = 2$$

3. Solve the given initial-value problem.

$$y'' + y' + 2y = 0, \quad y(0) = y'(0) = 0$$

4. Solve the given initial-value problem.

$$y'' + 16y = 0, \quad y(0) = 2, \quad y'(0) = -2$$

5. Solve the given initial-value problem.

$$y'' - 10y' + 25y = 0, \quad y(0) = 1, \quad y(1) = 0$$