

EXAMPLES OF HOMOGENEOUS SECOND ORDER LINEAR EQUATIONS

1.
$$\frac{d^2y}{dx^2} - \frac{dy}{dx} = 2y.$$

2.
$$y'' - 16y = 0,$$

with the two sets of initial conditions

$$(a) \begin{cases} y(1) = 1 \\ y'(1) = 0 \end{cases}, \text{ and } (b) \begin{cases} y(1) = 0 \\ y'(1) = 1 \end{cases}.$$

3. $z'' - 2z' + z = 0$, with $z(0) = 0$, $z'(0) = 1$.

4.

$$\ddot{x} + 10 \dot{x} + 24 x = 0.$$

5.

$$\frac{d^2 x}{dt^2} - 6 \frac{dx}{dt} + 25 x = 0.$$

6. $\frac{d^2x}{dt^2} + 8\frac{dx}{dt} + 25x = 0$, with $x(0) = 0$, $\left(\frac{dx}{dt}\right)(0) = \frac{1}{2}$.