

Assignment 5: Differential Equations

Be sure to show all work, not just the final answer. The assignment is due at the beginning of class, August 20th.

1. Find the general solution to each of the following differential equations.

(a)

$$y'' - 2y' + 4y = 0$$

(b)

$$2y'' + 5y' - 3y = x^2 + 1$$

(c)

$$y'' + y' - 2y = e^x + \sin(2x)$$

2. Solve the initial value problem

$$4y'' - 4y' + y = x$$

with initial values $y(0) = 3$, $y'(0) = 1$.

3. Use variation of parameters to solve the differential equation

$$y'' - 5y' + 6y = e^{3x}.$$

4. Find the general solution of the differential equation $y'' - xy' - 2y = 0$.
5. Suppose a spring is lying flat on a table. It is compressed by a force which gives it an initial velocity of 3cm/s. Find how far the spring has gone from its equilibrium point after 1 second, if the spring has spring constant 4, mass 2, and the friction of the table has a damping constant of 6.