

Worksheet 22

Sections 306 and 310
MATH 54

Nov 6, 2018

Exercise 1. Can the method of undetermined coefficients be used to find a particular solution for the following?

(a) $y'' + 2y' - y = t^{-1}e^t$

(b) $y'' + 2y' - y = te^{-t}$

(c) $2y'' - 3y = 4t \sin^2(t) + 4t \cos^2(t)$

Exercise 2. Find a particular solution for each of the following:

(a) $y'' + 4y = 8 \sin(2t)$

(b) $y'' - 5y' + 6y = te^t$

Exercise 3. Find the form of a particular solution of the following equation, but do not evaluate the coefficients.

$$y'' - y' - 12y = 2t^6 e^{-3t}$$

Exercise 4. Find a general solution to the following differential equation:

$$y'' + 4y = \sin(t) - \cos(t)$$

Exercise 5. All that is known about a mysterious second-order constant-coefficient differential equation $y'' + py' + qy = g(t)$ is that $t^2 + 1 + e^t \cos(t)$, $t^2 + 1 + e^t \sin(t)$, and $t^2 + 1 + e^t \cos(t) + e^t \sin(t)$ are solutions.

- (a) Determine the general form of solutions to the homogeneous equation.
- (b) Find a suitable choice of p , q , and $g(t)$ that enables these solutions.