Math 45 - Section —
Homework 7
Friday, April 29, 2016

G.{1,2,3,4,5,6}

G1 Use the method of undetermined coefficients to find the general solution to

(a) $y''' - y'' - y' + y = 2e^{-t} + 3$

(b) $y^{vi} + y''' = 2016$

(c) $y^{iv} - y = \sinh(t)$

■

G2 In each of the following problems find the powers series solution around the given point

(a) $y'' - 2y = 0$, $x_0 = 0$

(b) $y'' - xy' - y = 0$, $x_0 = 0$

■

G3 In each of the following solve the differential equation by means of a power series around the given point x_0. In part (d) the recurrence relation cannot be solved explicitly, instead just find the first four terms of each of the two linearly independent solutions.

(c) $2y'' + xy' + 3y = 0$, $x_0 = 0$

(d) $y'' - xy' - y = 0$, $x_0 = 1$

■

G4 For each of the equations in problems $G2$ and $G3$, find the solution with initial values

$$y(x_0) = 4$$
$$y'(x_0) = -3.$$

■

G5 For each of the following differential equations find the first four nonzero terms in each of the two linearly independent power series solutions about the origin. What do you expect the radius of convergence to be for each solution?

(a) $y'' + \sin(x)y = 0$

(b) $e^x y'' + xy = 0$

■

G6 Use Frobenius method to find the first six terms of the solution to

$$x^2y'' + (x+1)y' - 6y = 0 \qquad x > 0$$

of the form $t^3 \sum_{k=0}^{\infty} a_k x^k$.

■