MATH 319, Fall 2013, Assignment 5

Textbook Questions (2 pages!)

Section 3.1, #10 Find the solution for the following initial value problem, sketch the graph of the solution and describe its behavior as t increases:

$$y'' + 4y' + 3y = 0,\ y(0) = 2,\ y'(0) = -1$$

#18 Find a differential equation whose general solution is $y = C_1 e^{-t/2} + C_2 e^{-2t}$.

Section 3.2, #5 Find the Wronskian of $y_1(t) = e^t \sin(t)$ and $y_2(t) = e^t \cos(t)$.

#6 Find the Wronskian of $y_1(\theta) = \cos^2(\theta)$ and $y_2(\theta) = 1 + \cos(2\theta)$.

#27 Verify that the following functions y_1 and y_2 are solutions of the given differential equation. Do they constitute a fundamental set of solutions?

$$(1 - x\cot(x))y'' - xy' + y = 0,\ 0 < x < \pi;\ y_1(x) = x,\ y_2(x) = \sin(x)$$

Section 3.3, #11 Find the general solution of the following differential equation:

$$y'' + 6y' + 13y = 0$$

#20 Find the solution of the following initial value problem, sketch the graph of the solution and describe its behavior for increasing t:

$$y'' + y = 0,\ y(\pi/3) = 2,\ y'(\pi/3) = -4$$

#35 Use the substitution $x = \ln(t)$ to solve the following differential equation

$$t^2 y'' + ty' + y = 0$$

Section 3.4, #8 Find the general solution of the following differential equation:

$$16y'' + 24y' + 9y = 0$$

#12 Solve the following initial value problem, sketch the graph of the solution and describe its behavior for increasing t:

$$y'' - 6y' + 9y = 0,\ y(0) = 0,\ y'(0) = 2$$

Section 3.5, Find the general solution of the following differential equations:

#7

$$2y'' + 3y' + y = t^2 + 3\sin(t)$$

#9

$$u'' + \omega_0^2 u = \cos(\omega t),\ \omega^2 \neq \omega_0^2$$