Assignment 3; Due date: 11 Nov

Exercise 4.1

3. Suppose y_1 and y_2 form a fundamental set of solutions of $ty'' + 2y' + te^t y = 0$. Given that $W(y_1, y_2)(1) = 3$. Find the value of $W(y_1, y_2)(5)$.

Exercise 4.2

1. Using the method of reduction of order to solve the equation given that $y_1(t)$ is a solution.

   (b) $t^2 y'' + 4ty' + 2y = 0$; $y_1(t) = t^{-1}$

Exercise 4.3

1. Find the general solution of the following second order linear equations.

   (b) $y'' + 9y = 0$ (d) $y'' - 8y' + 16y = 0$ (e) $y'' + 4y' + 13y = 0$

Exercise 4.4

1. Use the method of undetermined coefficients to find the general solution of the following nonhomogeneous second order linear equations.

   (e) $y'' + 2y' + y = 2e^{-t}$ (f) $y'' - 2y' + y = te^t + 4$ (g) $y'' + 4y = t^2 + 3e^t$

2. Write down a suitable form $y_p(t)$ of a particular solution of the following nonhomogeneous second order linear equations.

   (a) $y'' + 3y' = 2t^4 + t^2 e^{-3t} + \sin 3t$ (c) $y'' + y = t(1 + \sin t)$
   (b) $y'' - 5y' + 6y = e^t \cos 2t + 3te^{2t} \sin t$

Exercise 4.5

1. Use the method of variation of parameters to solve the equations.

   (a) $y'' - 5y' + 6y = 2e^t$ (b) $y'' - y' - 2y = 2e^{-t}$

Exercise 4.7

1. Write down a suitable form $y_p(t)$ of a particular solution of the following equations.

   (c) $y^{(4)} - 2y'' + y = te^t$ (e) $y^{(4)} + 2y'' + y = t \cos t$