

### Math 2142 Homework 5 Part 1: Due Friday February 23

**Problem 1.** For the following homogeneous second order differential equations, give the general solution and the particular solution satisfying the given initial conditions.

$$\begin{aligned}y'' + 2y' - 3y &= 0 \text{ with } y(0) = 6 \text{ and } y'(0) = -2 \\y'' + 4y' + 20y &= 0 \text{ with } y(0) = 2 \text{ and } y'(0) = -8 \\y'' - 4y' + 4y &= 0 \text{ with } y(0) = y'(0) = 1\end{aligned}$$

**Problem 2.** Use the method of undetermined coefficients to find the general solutions for the following differential equations.

$$\begin{aligned}y'' - 5y' + 4y &= e^{4x} \\y'' + 3y' + 2y &= x^2\end{aligned}$$

**Problem 3.** Use the method of undetermined coefficients to solve the initial value problems.

$$\begin{aligned}y'' + 4y' + 13y &= -3e^{-2x} \text{ with } y(0) = y'(0) = 0 \\y'' + 6y' + 8y &= \cos x \text{ with } y(0) = y'(0) = 0\end{aligned}$$