Math 217 - October 8, 2010

- Long and messy undetermined coefficients
- Variation of parameters

1. Find the general form of a solution to

$$4y'' - 3y' + 2y = 12x^3 \sin x - x^3 e^{3x} + 2x^4 - 3e^{2x} \sin x + 5x^2 e^{3x} \cos 7x$$

2. Show that $y_1 = -2\sin x + 3\cos x$ is a particular solution to $4y'' - 3y' + 2y = 13\sin x$

3. Show that $y_1 = 2e^{2x}$ is a particular solution to $4y'' - 3y' + 2y = 24e^{2x}$

4. Find a particular solution to $4y'' - 3y' + 2y = 13\sin x + 24e^{2x}$

Lecture Problems

5. Use variation of parameters to find a particular solution. (You may be able to do some of these another way, but you should be able to do these using variation of parameters!)

   (a) $y'' - 2y' + y = \frac{e^x}{x^2+1}$

   (b) $y'' + y = 2\sec x$

   (c) $xy'' - (x+1)y' + y = x^2$ given $y_c = c_1 e^x + c_2(x+1)$.