**Math 33b, Winter 2013, Tonći Antunović - Homework 6**

From the textbook solve the problems:

Section 4.5: 18, 20, 22, 26, 28, 32, 34, 36, 38, 42

Section 4.6: 2, 8, 14

And also the problems below:

**Problem 1.** Find the general solution of the equation

$$y'' + 2y' + y = e^t - \sin t.$$

**Problem 2.** Find the solution of the initial value problem

$$y'' - 4y' + 4y = -e^{2t}, \quad y(0) = 0, \quad y'(0) = 1.$$

**Problem 3.** Find the solution of the initial value problem

$$y'' + 2y' - 3y = 13\sin(2t) - 2\sin t, \quad y(0) = 0, \quad y'(0) = 0.$$

**Problem 4.** Write down a second order linear differential equation with constant coefficients whose general solution is $y = e^{-t}(C_1 \sin t + C_2 \cos t) + e^t$.

**Problem 5.** Consider the differential equation

$$y'' + py' + qy = f(t),$$

where $p$ and $q$ are constants. Let $y_1$, $y_2$ and $y_3$ be three solutions of this equation such that $y_1 - y_2$ and $y_1 - y_3$ are linearly independent. Show that the general solution of this equation is $y = (1 + C_1 + C_2)y_1 - C_1 y_2 - C_2 y_3$.