**MATH 267 (Sections A3, C-1) Homework No. 5**

**Reading**

Section 4.5
Section 4.6
Section 4.7

**Suggested Problems**

Section 4.5, Exercises 3,7,15,25,27,31,33,41,43.
Section 4.6, Exercises 3,5,7
Section 4.7, Exercises 1, 9, 13, 15

**Problems to be handed in (due Monday February 21-st)**

**Problem 1** (13 points)

Use the method of undetermined coefficients to find a particular solution of the following inhomogeneous linear O.D.E.

$$y'' - y' = t + e^t cos(t).$$

**Problem 2** (8 points)

Use the method of variation of parameters to find a particular solution of the following inhomogeneous linear O.D.E.

$$y'' - y' = e^t.$$

**Problem 3** (9 points)

Consider the following forced harmonic motion for general forcing frequency $\omega$:

$$x'' + 2x' + 4x = 3cos(\omega t).$$

1. Write the **gain** $G(\omega)$ as a function of $\omega$.
2. Write the **phase** $\phi(\omega)$ as a function of $\omega$.
3. Write the **transfer function** $H(\omega)$ as a function of $\omega$
4. Write the general solution as a function of $\omega$ and indicate the **steady state** and the **transient** term.