

## MATH 267 Sections A3-C1 Practice Test Number 2

**Problem 1.** (25 points) Calculate the solution of the following initial value problem:

$$x'' + 2x' + 5x = 0,$$

$$x(0) = 0, \quad x'(0) = 1.$$

**Problem 2.** (25 points) Use the **method of undetermined coefficients** to find a particular solution of the following inhomogeneous linear differential equation

$$x'' - x = te^t + \cos(t).$$

**Problem 3.** (25 points) Use the **method of variation of parameters** to find a particular solution of the following inhomogeneous linear differential equation. Then find the general solution.

$$x'' - x = t + 1.$$

**Problem 4.** (25 points). Consider an RLC circuit with  $R = 6$ ,  $L = 3$ ,  $C = 3$ .

1. Write down the transfer function for this circuit.
2. Assume you are forcing the circuit with a generator  $E(t) = -3\cos(2t)$ . Use the **complex method** to find the current  $I = I(t)$  corresponding to the initial conditions  $I(0) = I'(0) = 1$ . Identify the transient and steady term in your solution.