HOMEWORK 7

- Section 4.6 in the book: Exercises 8, 12, 14.

Problem 1. Find the general solution to the equation

$$4x'' - 4x' + x = e^{t/2}\sqrt{1-t^2}.$$

Problem 2. Use the method of undetermined coefficients (or the method of annihilators) to find the general solution to the equation

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

Problem 3. Consider the equation

$$tx'' - (1+t)x' + x = t^2e^{2t} \quad \text{for} \quad t > 0.$$

(a) Verify that $\phi_1(t) = 1 + t$ and $\phi_2(t) = e^t$ form a fundamental set of solutions to the corresponding homogeneous equation for $t \in (0, \infty)$.

(b) Find a particular solution to the given inhomogeneous equation.

(c) Write down the general solution to the inhomogeneous equation.