Notes for lecture 6

1. Date: May 16th. This lecture is based on Sections 3.5 and 3.6 of Chapter 3 of the main textbook (see Chapter3.5.pdf and Chapter3.6.pdf file)
2. Section 3.5 (see Chapter3.5.pdf and Lecture6.pdf) consider nonhomogeneous (with non-zero right hand side) linear differential equation of 2nd order (with constant coefficients). The key points are as follows.
    a. The right hand side is not zero, and it has a certain structure (what is called as quasi-polynomial).
    b. Due to the specific structure, computation of integrals is not necessary. The general solution is found by an algebraic technique (called method of undetermined coefficients).
    c. We are going to use the method of undetermined coefficients later on (when studying higher order differential equations). So, please make sure you understand it well.
3. Section 3.6 (see Chapter3.6.pdf and Lecture6.pdf) consider nonhomogeneous (with non-zero right hand side) linear differential equation of 2nd order. The key points are as follows.
    a. The right hand side is not zero, and it is not restricted to a particular structure (i.e. quasi-polynomials that we dealt with in the last class).
    b. Since the structure of the right hand side is general, a general technique (called method of variation of parameters) is employed for establishing the general solution. Note that when using this technique computation of integrals IS necessary.
    c. We are going to use the method of variation of parameters later on (when studying higher order differential equations). So, please make sure you understand it well.
4. Explanation of the content is accompanied by examples. In addition, you can look at sample problems (see SampleProblems6.pdf file)
5. Additional Internet resources
    a. Short videos from Khan Academy on linear homogeneous equations https://www.khanacademy.org/math/differential-equations/second-order-differential-equations#undetermined-coefficients are recommended.
    b. Computing integrals that look difficult to you, you can use Wolfram Alpha, see https://www.wolframalpha.com/examples/mathematics/calculus-and-analysis/
6. The deadline for submitting homework, Assignment 6 (refer to Assignment6.pdf) is May 23, 13:00. Solutions to this assignment (refer to Assignment6_sol.pdf) will be uploaded to Resource Section on May 23 after the class.