

Notes for lecture 7

1. Date: May 23rd. This lecture is based on Sections 4.1 and 4.2 of Chapter 4 of the main textbook (see Chapter4.1-4.2.pdf)
2. Section 4.1 (see Chapter4.1-4.2.pdf and Lecture7.pdf) consider general theory of homogeneous (with zero right hand side) linear differential equation of n -th order where $n > 2$. The key points are as follows.
 - a. The concept of linearly independent solutions is extended more or less straightforwardly, and the definition of Wronskian now requires knowledge of $(n-1)$ derivatives of the independent solutions.
3. Section 4.2 (see Chapter4.1-4.2.pdf and Lecture7.pdf) consider homogeneous linear differential equations with constant coefficients. The key points are as follows.
 - a. Dealing with higher order equations with constant coefficients is conceptually similar to what we learnt for 2nd order equations. However, now it is important to count correctly the real and imaginary roots and their multiplicities. In general, the complex roots can be repeated (we didn't have it in 2nd order equations).
 - b. Defining the roots of characteristic equations (that can be complex numbers) can be difficult. In some situations it is instrumental to know how to compute roots of complex numbers (see file Complexnumbers_roots.pdf).
4. Explanation of the content is accompanied by examples. In addition, you can look at sample problems (see SampleProblems7.pdf file)
5. The deadline for submitting homework, Assignment 7 (refer to Assignment6.pdf) is May 30, 13:00. Solutions to this assignment (refer to Assignment7_sol.pdf) will be uploaded to Resource Section on May 30 after the class.