

Notes for lecture 11

1. Date: June 20th. This lecture is based on Sections 6.6, Chapter 6, and 7.1, 7.4, Chapter 7, of the main textbook (see Chapter6.6.pdf, Chapter7.1.pdf, Chapter7.4.pdf).
2. Section 6.6 (see Lecture11a.pdf) deals with the definition of the convolution integral and its use in writing the solution of differential equations.
3. Section 7.1 (see Chapter7.1.pdf and Lecture11b.pdf) introduces systems of differential equations. The text is mostly introductory. The key point to remember is as follows.
 - a. Every linear differential equation of n -th order can be represented as a system of n equations of 1st order. The reverse statement is not true. Strictly speaking, there are linear systems of 1st order equations that cannot be converted to a single linear n -th order equation.
4. Section 7.4 (see Chapter7.4-7.5.pdf and Lecture11c.pdf) shapes the basic theory of linear differential equations. The key point is as follows.
 - a. Matrix notation is introduced;
 - b. Solution of homogeneous systems is represented by a linear combination of fundamental solutions.
 - c. To check whether solutions are fundamental or not, Wronskian is defined.
5. It is highly recommended to refresh your knowledge of Linear Algebra. For your reference, supplemental material (BrushUp_Chapter 7.2-7.3, and BrushUp_LA.pdf file) is included.
6. The deadline for submitting homework, Assignment 11 (refer to Assignment11.pdf) is June 27th, 13:00. Solutions to this assignment (refer to Assignment11_sol.pdf) will be uploaded to Resource Section on June 27th after the class.