

## Topics for exam 3, MATH308-SPRING 2015

1. Step functions and differential equations with discontinuous forcing function (sections 6.3, 6.4)
2. Impulse functions (section 6.5)
3. The convolution integral (section 6.6)

**Remark** The table of Laplace transform as in the page 317 of the textbook will be given. It is recommended to practice to use this table.

4. Chapter 7, sections 7.1-7.5. The main points to know are:
  - (a) how to transform a scalar differential equation of higher order to a system of differential equations of the first order;
  - (b) how to transform a system of differential equations to a matrix form.
  - (c) what is a fundamental set of solutions of a first order linear homogeneous system of differential equations and how to check that the given set of solutions is fundamental (section 7.4).
  - (d) what are eigenvalues and eigenvectors of a given matrix and how to find them (section 7.3).
  - (e) how to solve a system of differential equations and IVP<sup>1</sup> in the case of distinct real eigenvalues (section 7.5).

Especially pay your attention here on *how on the base of the knowledge of the eigenvalues and eigenvectors to form a fundamental set of solutions and to write the general solution.*

*It is recommended to review all problems in homework assignments 10-13 and the examples given during the class on the topics listed above. In addition, it is useful to review homework assignments 12-15 of Fall 2013 term posted at <http://www.math.tamu.edu/zelenko/F13308Hmwk.html>; also problem 5 of homework assignments 6, homework assignments 7 (except the bonus problem 7 there) and the entire homework 8 of Spring 2012 term posted on <http://www.math.tamu.edu/zelenko/308Hmwk.html>*

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<sup>1</sup>especially in the case  $n = 3$  you have to practice the Gauss elimination method.