

Topics for exam 3, MATH308-FALL 2012

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 7.1-7.6. 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 IVP¹ in the case of distinct real eigenvalues (section 7.5).
 - (f) linear systems of differential equations with constant coefficients and complex eigenvalues (in the cases $n = 2$ and $n = 3$) (section 7.6);

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 12-16, the examples given during the class on the topics listed above. In addition, it is useful to review homework assignments 11-15 of Fall 2012 term posted at <http://www.math.tamu.edu/zelenko/F12308Hmwk.html>; problem 3 of homework assignment 12 and also the whole homework 13 of Summer 2012 term posted at <http://www.math.tamu.edu/zelenko/Su308Hmwk.html> and also problem 5 of homework assignments 6 and entire homework assignments 7-9 of Spring 2012 term (except problem 1 and 4 in homework assignment 9 there) posted on <http://www.math.tamu.edu/zelenko/308Hmwk.html>

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