

Topics for Exam 3, MATH308-Spring 2013

1. Chapter 6 (sections 6.3-6.5)
 - (a) Step functions and DE with Discontinuous Forcing Functions (including how to find the Laplace transform for a piecewise continuous function (with the help of step functions, sections 6.3, 6.4) and for an impulse function (section 6.5)
 - (b) How to use the convolution for finding inverse Laplace Transform and solution of IVP (section 6.6)

Note that, as in the midterm exam 2, the table of Laplace transform as in the page 317 of the textbook will be given but you have to be aware that before using the table you will have to make an appropriate work based on the techniques you learned.

2. Chapter 7, sections 7.1, 7.3-7.6. The main points to know are:
 - (a) how to transform a system of differential equations to a matrix form.
 - (b) 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).
 - (c) what are eigenvalues and eigenvectors of a given matrix and how to find them (section 7.3).
 - (d) how to solve a system of differential equations and IVP¹ in the following cases:
 - i. distinct real eigenvalues (section 7.5);
 - ii. complex eigenvalues (section 7.6)
 - iii. repeated eigenvalues (restricted to the case $n = 2$)(Section 7.8)

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 topics discussed in class. Review problems in homework assignments 10-15; the examples given during the class on the topics listed above, the problems in homework assignments 6(#5), 7-9 of Spring 2012 term posted on

<http://www.math.tamu.edu/~shatalov/308Hmwk.html>.

Also attempt the additional suggested problems listed in the Class Announcements.

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