

**PHY101 HW #9**  
**Due Friday, 3/08/13 @ 5pm**  
**Laplace Transforms and solving differential equations**

**Reading**

Our focus this week in class will be on using Fourier and Laplace Transforms to solve ODE's. Read Chapter 8 of Boas, and re-read the relevant part of section of section 7 from Chapter 14.

**Problems**

**Do not use tables of transforms for any of these problems. Compute all transforms and inverse transforms using contour integration.**

New Problems:

Use Fourier transforms to compute the response of a damped Harmonic oscillator to a square-wave driving force for which  $A(t) = f(t)/m$  vanishes except that  $A(t) = A_0$  (a non-zero constant) for  $0 < t < T$ . *Hint:* One way to solve the problem is explained in my notes for lecture #20. While I only presented part of the calculation in class, most of this problem is just working through the rest of those notes and then working out the final details for the over- and under-damped cases. (My notes contain the full solution for the critically-damped case.)

Chapter 8, Section 9, pages 442-444: problems 18, 28

Chapter 8, Section 10, pages 448-449: problems 14, 18

Chapter 14: Section 7, page 702: problems 63, 66

Chapter 8: Section 12, page 464-466: problems 15, 16. Use the Green's function method for both problems.