

Hints for Midterm 2 Solas:

Problem 1 (Multiple choice)

1. Not all functions have a Laplace transform.

See Oct 20 lecture p 4

B+D 9th ed p 309.

2. Inverse Laplace Transforms - see HW 6

- Various lectures (e.g. Oct 25)

- B+D 9th ed p 320 problems 1-10

p 329 19-24

p 350 8-11

[Note which sections these are in to see what general ideas apply].

3. See ODEs and impulses (Dirac δ function)

Oct 27 lecture

B+D Section 6.5

problems p 343 1-12

4. Amplitudes of (oscillatory) solns to 2nd order ODE with forcing

See: Oct 13 Lecture

- HW 4

- B+D Section 3.8, (in particular, Fig 3.8.2)

5. Classifying behaviour of 2nd order sys of Lin 1st order ODEs.

See: Nov 3 lecture +

review on Nov 8. and posted "extra problems"

" " Nov 15

6. Oscillations and beats: See Oct 13 lecture

HW 4

B+D 9th ed pp 212-213, Fig 3.8.7

- Step functions:
- Problem 2: See Oct 25 lecture
- HW 6
 - B+D 9th ed Section 6.3

Many people did not write down the function correctly. Think about each line segment in the graph, what its eqn would be, and how to "turn it on" and "turn it off"

Example:

Result: $f = (3-t)[u_1(t) - u_2(t)]$

If figure has several line segments (as in Probl 2), repeat this procedure to get each part.

- Problem 3: (a)-(c) Inverse Laplace Tr. See suggested practice on previous page.
- (d) Undetermined coeffs: See HW 4 problem 2D.

- Problem 4:
- (a) Impulsive inputs. (see suggestions on previous page)
 - (b) Current $I = \frac{dq}{dt}$; [Velocity $v = \frac{dy}{dt}$]
so from (a) can get (b) by differentiating
 - (c)-(d) Convolutions: Nov 1 lecture and online posted "extra problems" B+D Sec 6.6.