

Math 222, Spring 2016.

Present your work in an organized fashion. Make sure that your work is algebraically correct and logically sound. Show all your work. Discussion (if necessary) with others is encouraged, while copying other's solution is a violation of NJIT student honor code. Do not forget that you should also be able to do (but not hand in) the homework problems listed on the syllabus.

Homework Problems for Chapter 6

1. Find the Laplace transforms of the following functions.
 - (a) $a(t) = te^t \sin(t)$.
 - (b) $b(t) = 2t \cos^2(t)$.
 - (c) $c(t) = t^3 e^{-3t}$.
2. Find functions $f(t)$, $g(t)$, and $h(t)$ with the following Laplace transforms.
 - (a) $\mathcal{L}[f(t)] = \frac{s}{(s-3)^3}$.
 - (b) $\mathcal{L}[g(t)] = \frac{s+1}{s^2+2s+10}$.
 - (c) $\mathcal{L}[h(t)] = \frac{s^2+4s-15}{(s-1)(s^2+9)}$.
3. Use Laplace transforms to solve the following differential equation and discuss the behavior of the solution.

$$y'' + 3y' + 2y = -5 \sin(t) + 5 \cos(t), \quad y(0) = 5, \quad y'(0) = -3.$$

4. Use Laplace transforms to solve the differential equation

$$y'' + y = 4u_\pi(t), \quad y(0) = 2, \quad y'(0) = 4.$$