

MATH 267 (Sections A3, C-1) Homework No. 7

Reading

Section 5.3

Section 5.4

Section 5.5 (up to pg. 272)

Section 5.6

Suggested Problems

Section 5.3, Problems 1,3,11,15,23,25,27.

Section 5.4, Problems 1,3,13,15,23

Section 5.5, Problems 11,13,25,17,19

Section 5.6 Problems 3,5,9.

Problems to be handed in class (due Tuesday March 22-th)

Problem 1 (10 points) Use the Laplace transform to solve the following initial value problem. Notice the initial condition at $t = 1$.

$$y'' - 2y' + y = e^t, \quad y'(1) = 0, y(1) = 1,$$

Problem 2 (10 points) Calculate the Laplace transform of the following discontinuous function $f(t)$ by first expressing it in terms of Heaviside function.

$$\begin{aligned} t, & \quad 0 \leq t \leq 2, \\ \cos(t), & \quad 2 \geq t. \end{aligned}$$

Problem 3 (10 points) Calculate the inverse Laplace transform of the following function and express it in terms of Heaviside function.

$$F(s) = \frac{e^{-s} - e^{-2s}}{(s-1)(s^2+1)}.$$