

MTH 256 Lesson 22 - Laplace Transforms Introduction

The definition for a Laplace Transform on a function $y(t)$ is $Y(s) = \mathcal{L}[y(t)] = \int_0^{\infty} y(t)e^{-st} dt$.

1. Apply the Laplace Transform on the following generalized functions to obtain some basic formulas for Laplace Transforms:

a. $f(t) = e^{at}$

c. $h(t) = t$

b. $g(t) = c$

d. $\mathcal{L}\left[\frac{dy}{dt}\right]$ for a function $y(t)$

2. Solve the initial-value problem $y' + 5y = e^{-t}$, $y(0) = 2$ using Laplace Transforms.

3. Solve the initial-value problem $y' + 4y = 2 + 3t$, $y(0) = 1$ using Laplace Transforms.

See page 626 in the textbook for a list of commonly used Laplace Transformations on their Inverses.