Instructional Objectives for Roberts Chapter 9 –
The Laplace Transform

9.1 – Introduction and Goals

9.2 Development of the Laplace Transform

Write the equation to compute the Laplace transform of a waveform and its ROC
State why the ROC is necessary in computing the Laplace transform
Describe the difference between the Laplace transform equation and the Fourier transform equation
Describe the differences between the unilateral and bilateral Laplace transforms, and for what type of signals/systems they are used

9.3 Properties of the Laplace Transform

Apply the properties of the Laplace transform to simplify Laplace calculations

9.4 The Inverse Laplace Transform Using Partial-Fraction Expansion

Given a transfer function, compute its partial fraction expansion
Given the Laplace transform and ROC of a signal or system, compute the associated waveform or impulse response

9.5 Laplace Transform-Fourier Transform Equivalence

Determine if the Fourier transform exists for a signal based on the Laplace transform's ROC

9.6 Solution of Differential Equations with Initial Conditions

Apply Laplace theory to solve differential equations with or without initial conditions

9.7 The Bilateral Laplace Transform

Compute the bilateral Laplace transform of a causal, anti-causal or noncausal waveform
Determine if a signal is causal, anti-causal or noncausal based on its Laplace transform ROC
Given a transfer function, sketch the pole-zero plot