Read: Ch. 13, Sect. 1-5, 7 in *Electric Circuits, 9th Edition* by Nilsson

Procedure: Circuit Analysis using the Laplace-transformed Circuit

1) Draw the circuit at $t = 0^-$.
   - Assume that the circuit is in steady state.
   - Draw inductors as short circuits and capacitors as open circuits.
   - Find $v_C(0^-)$ and $i_L(0^-)$.
   - These values are needed for the s-domain circuit (step 2).
2) Draw the s-domain circuit for $t > 0$.
3) Analyze the circuit as you might analyze a DC circuit (using any circuit analysis method). Recall that the s-domain impedances sL and 1/(sC) act essentially like resistors. Determine the desired result in the s-domain (V(s), I(s), etc).
4) Convert the result back to the time domain. In other words, use inverse Laplace transforms to find v(t) or i(t) from V(s) or I(s).

Review: Methods of Circuit Analysis

Since the Laplace-transformed circuit (or s-domain circuit) can be analyzed like a DC resistive circuit, any of the circuit analysis methods covered in EGR 260 can be used, including:

- KVL and KCL
- Combining impedances in series and parallel
- Voltage and current division
- Source transformations
- Superposition
- Node and mesh equations
- Thevenin's and Norton's theorems

Voltage Division

- Applies to series circuits only.
- Voltage divides proportionally between series impedances with the largest impedance getting the most voltage.
- The general form for voltage division is:

$$V_i(s) = V_{Source}(s)\left[\frac{Z_i(s)}{Z_{eq}(s)}\right] \quad \text{where } Z_{eq}(s) = Z_1(s) + Z_2(s) + \ldots + Z_N(s)$$