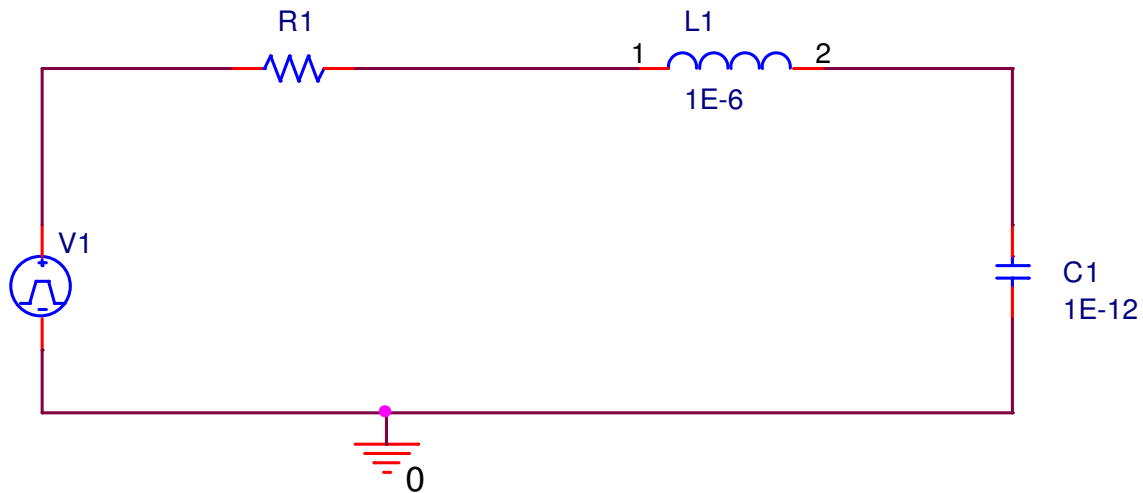S-domain analysis with initial conditions



$$L_1 := 1 \cdot 10^{-6} H \qquad C_1 := 1 \cdot 10^{-12} F \qquad V_{1t0+} := 10v \qquad V_{1t0-} := 5v$$

In the circuit above, the voltage source is 5V for t<0 and 10 V for t >0.

a. Draw the s-domain equivalent circuit.  Include the intial conditions in your s-domain circuit.  Label your component values using symbolic notation (i.e. sL1).

b. Using impedances, determine the transfer function for the voltage across C1.  Use symbolic numbers in your expression.

c. Using your result from part b., determine the transfer function for the current through the capacitor.

d. Using the transfer function from part c. for R1 = 5kΩ, determine the current through the capacitor as a function of time for t>0.