**Project**

A circuit simulation project to transition you from lumped component-based circuit theory

In Part 1 and Part 2, you built an LC network:

And, you did transient simulations of the following circuits with the generator signal being voltage steps with different rise times:

Part 3: Now, create a new network that is a cascade of 10 instances of the above LC network. You may create a symbol for this new network for convenience. Using the same inductance and capacitance values to do the same simulations you have done for the above single LC network. (Same generators with same internal impedance. Simulate for both open circuit and 50-ohm loads, the two rise times for each case, as done for the single LC.)

Ongoing project. Stay tuned for next steps.
**Project**

A circuit simulation project to transition you from lumped component-based circuit theory

In Part 1 and Part 2, you built an LC network:

In Part 3, you built a cascade of 10 instances of this LC network.

And, you did transient simulations of the following circuits (with the 1-unit and 10-unit networks) with the generator signal being voltage steps with different rise times:

Part 4: Now, create a new network that is a cascade of 10 instances of the 10-unit network, so that this new network contains 100 units. You may create a symbol for this new network for convenience. Using the same inductance and capacitance values, do the same simulations you have done for the above 1- and 10-unit networks. (Same generators with same internal impedance. Simulate for both open circuit and 50-ohm loads, the two rise times for each case, as done for the single LC.)

Ongoing project. Stay tuned for next steps.
Project

A circuit simulation project to transition you from lumped component-based circuit theory

In Part 1 and Part 2, you built an LC network:

In Part 3, you built a cascade of 10 instances of this LC network. In Part 4, you built a cascade of ten such 10-unit networks, which is 100-unit.

And, you did transient simulations of the following circuits (with the 1-unit and 10-unit networks) with the generator signal being voltage steps with different rise times:

Part 5: Now, create a new network that is a cascade of 10 instances of the 100-unit network, so that this new network contains 1000 units. Using the same inductance and capacitance values, do the same simulations you have done for the above 1-, 10-, and 100-unit networks.

Ongoing project. Stay tuned for next steps.
Part 6: A lossless transmission line system is shown as above. The generator generates an ideal step function with a 1 V step height. The transmission line parameters are as follows: Unit length inductance $L’ = 0.3$ nH/mm, unit length capacitance $C’ = 0.12$ pF/mm. Calculate the characteristic impedance $Z_0$ of the line and the phase velocity $v_p$. Plot the waveforms of $V_1$ and $V_2$. How do you relate these waveforms to the simulations you have done?

Now, the 50 Ω load is replaced with an open circuit. Plot the waveforms of $V_1$ and $V_2$. (You may construct a bounce diagram if needed.) How do you relate these waveforms to the simulations you have done?