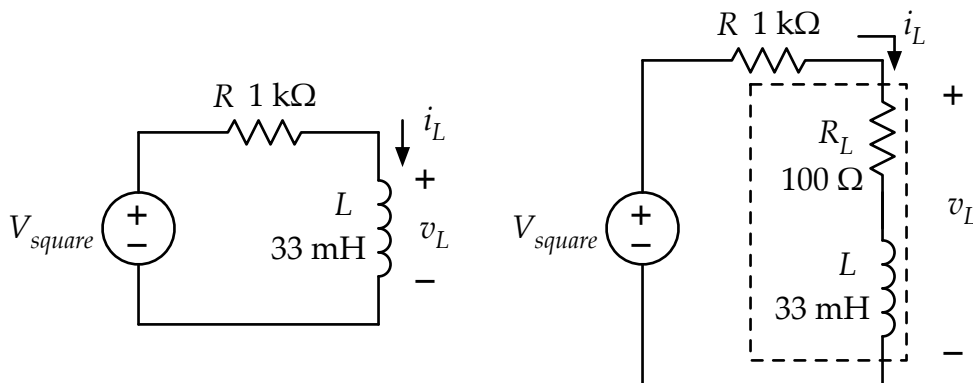


Parasitic resistances in inductors can have significant effects, even in simple circuits like we use in lab. In this problem, we will use PSPICE to look at an example where the inductor resistance has a noticeable affect.

Use SPICE to run transient simulations that show the “amping up” and “amping down” of the current in the two circuits shown below. For the first simulation, assume that the inductor is ideal with no parasitic resistance. For the second, include $100\ \Omega$ of coil resistance for the inductor – similar to what is found in the cheap inductors that are in some of the lab kits. For both circuits, run the simulations long enough to show at least one upward transient and one downward transient. Make plots of the inductor current and the inductor voltage for both circuits. Note that for the second circuit, the inductor voltage includes the inductor resistance – for a real inductor, you cannot measure the inductance independently of the resistance.

For the square wave source, set the minimum at 0 V and the maximum at 10 V. Set the frequency at 500 Hz – 1 ms high and 1 ms low.

You will probably want to go through the PSPICE tutorial on running RL and RC transient simulations.



Include the two plots of i_L and v_L versus time for each simulation. Comment on the differences that you see.