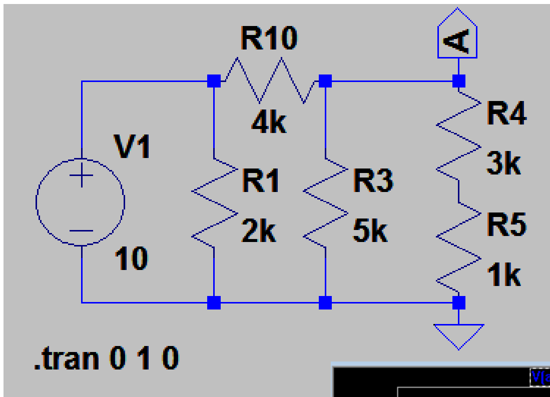
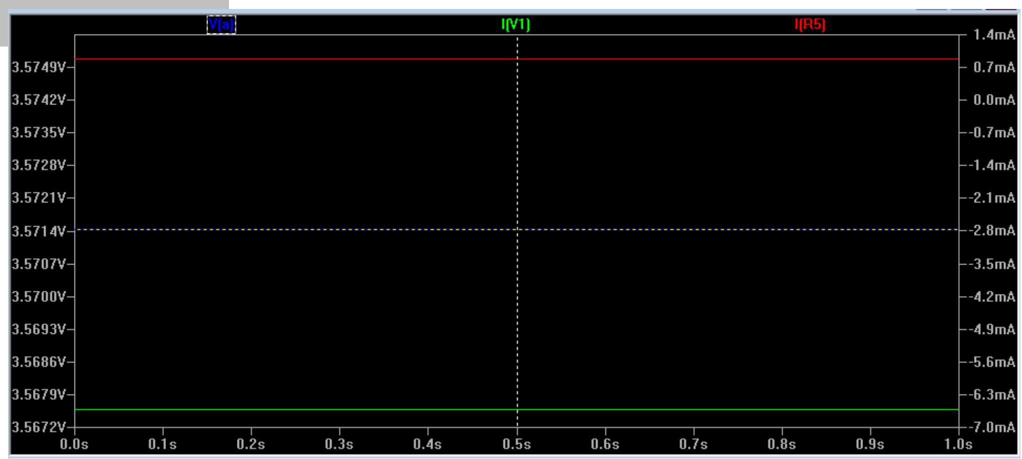
Problem 2.20:



The equivalent resistance can be found from $R_{eq} = \frac{V_1}{i}$ where V_1 is the voltage from the power supply and i is the current through the power supply. We can find these from a LT spice simulation. The values are:

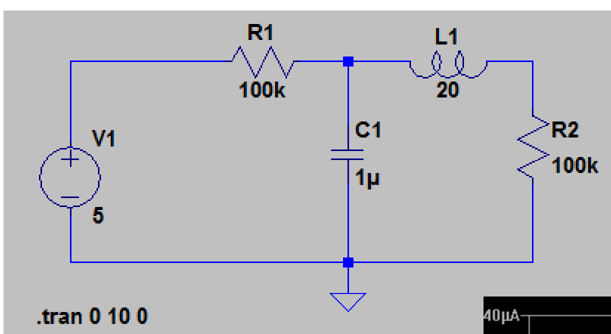
V_1=10V, i=6.61mA so that R_{eq}=1.51kΩ.

The voltage at node A is 3.57V and the current through resistor R_5 is 0.89mA.



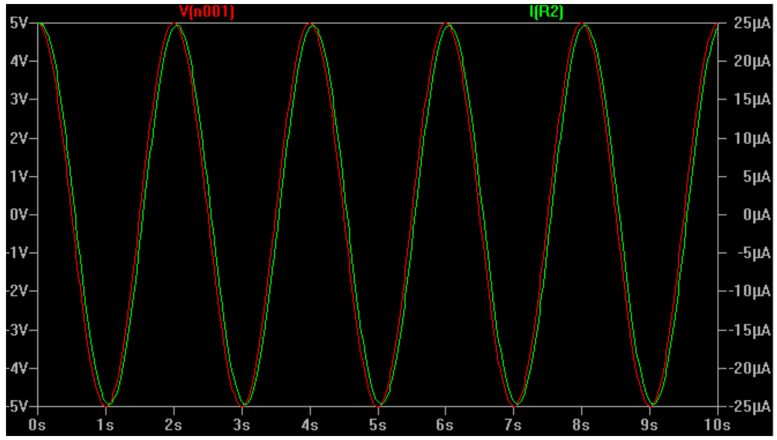
Note that 2.19 and 2.20 differ only in degree of neatness and resistor value, they are topologically identical.

Problem 2.33



a) For the circuit with V_s=5V_{DC} the steady state can be easily found by hand as the inductor is a resistance-free wire at that frequency and $i = \frac{v}{R} = \frac{5V}{200k\Omega} = 25\mu A$. Which can also be found using spice.

b) For $V_s = 5V\cos(\pi\, t)$ the amplitude is 5V, the frequency $f = \frac{\omega}{2\,\pi} = 0.5Hz$, and the phase for a cosine from a sine is -90 degrees. This yields a V_s in red and the current I(t) in green:



They are nearly in phase and the amplitude of the current is 25µA with a minor phase shift. For these component values the inductor and capacitor have essentially no effect on the current through the resistors.