ECE581

Analysis of a Series Resonant Circuit in the Time Domain

Figure 1 shows a series L-C circuit. At time $t = 0$, $v_c(0) = V_0$ and $i_L(0) = I_0$.

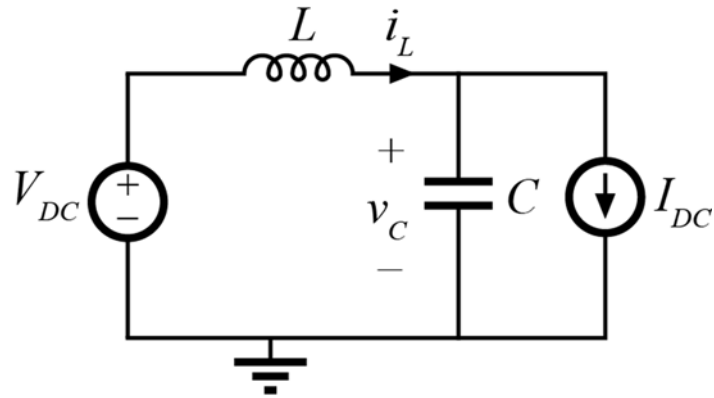
Figure 1: Series L-C circuit

(a) Write the two differential equations describing the circuit waveforms
(b) Solve the equations in (a) to find analytical expressions for $v_c(t)$ and $i_L(t)$ for $t > 0$
(c) Find expressions for the maximum value of $v_c(t)$ and the time at which it reaches this maximum
(d) Find expressions for the maximum value of $i_L(t)$ and the time at which it reaches this maximum