Discussion 3A

Note 3 along with corresponding lectures are most relevant to this discussion worksheet.

1. Analyzing a Second-Order Circuit (Adapted from Hambley Example 4.5)

A DC source is connected to a series *RLC* circuit by a switch that closes at $t = 0$ as shown in Figure 1. The initial conditions are $i(0) = 0$ and $v_C(0) = 0$.

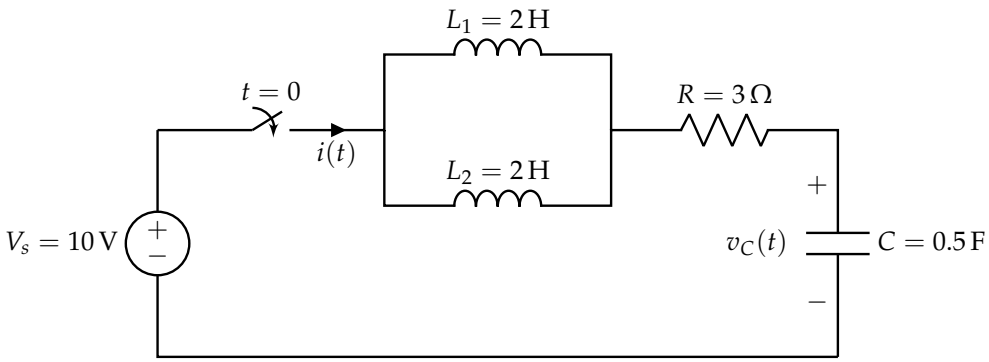


Figure 1: RLC Circuit

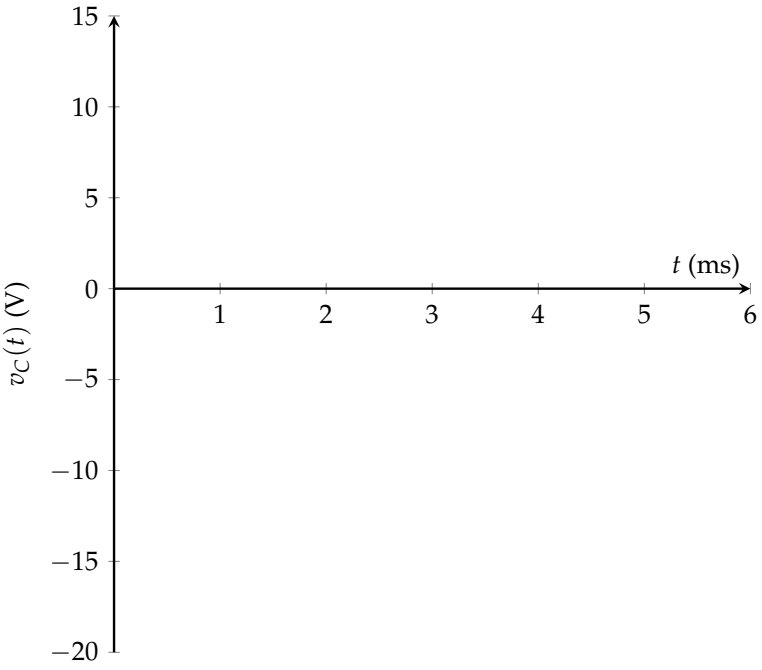
(a) **Find the equivalent inductance and redraw the circuit as a standard series RLC.**

(b) **Write the differential equation for** $v_c(t)$

(c) **Solve for $v_C(t)$ if $R = 3\,\Omega$.**

(d) **Redraw the circuit in steady state and find the steady state value for $v_C(t)$.**

(e) **Plot the equation you calculated for $v_C(t)$.** It may be helpful to draw out each term in your general solution and then add them together.



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