



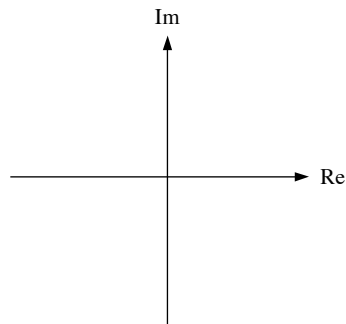
1. a) Find $\mathcal{L}\left\{\left(\int_0^{t-2} \tau e^{-3\tau} d\tau\right)u(t-2)\right\}$.

b) Find $v(t)$ if $V(s) = 2 + \frac{s^2 + s + 4}{s(s^2 + 4)}$.

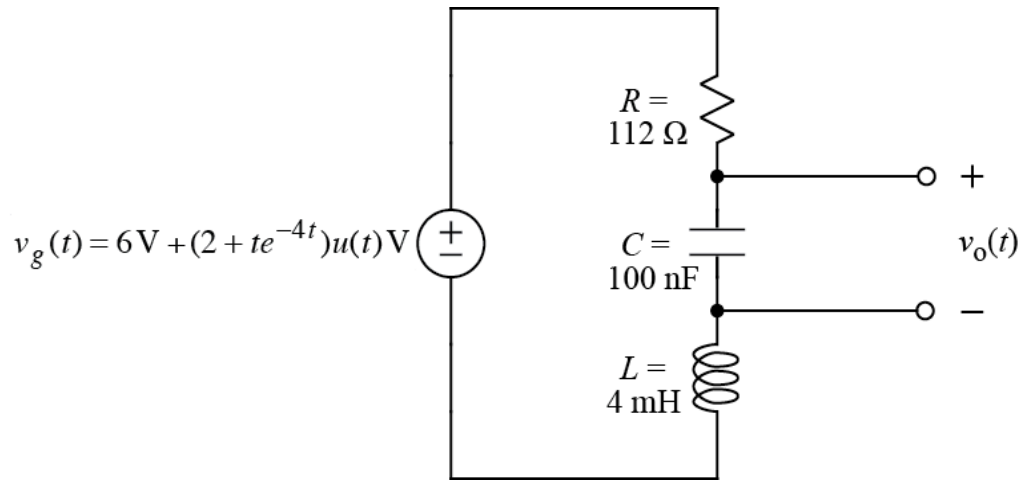
c) Find $\lim_{t \rightarrow 0} v(t)$ if $V(s) = \frac{(3s^2 + 12)(s - 4)}{[(s + 2)^2 + 5^2](s^2 + 5s + 6)}$.

d) Plot and label the values of the poles and zeros of $V(s)$ in the s plane.

$$V(s) = \frac{3s^2 + 12}{[(s + 2)^2 + 5^2](s^2 + 5s + 6)}$$



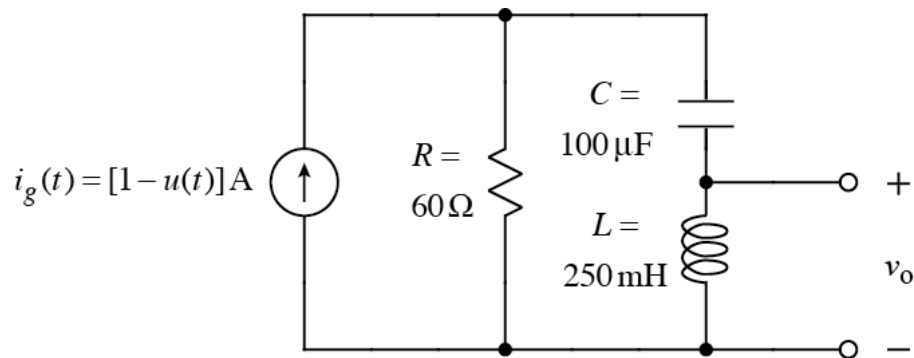
2.



Note: The 6 V in the $v_g(t)$ source is always on.

- a) Write the Laplace transform, $V_g(s)$, of $v_g(t)$.
 - b) Draw the s -domain equivalent circuit, including source $V_g(s)$, components, initial conditions for C 's, and terminals for $V_o(s)$.
- 3.
- c) Write an expression for $V_o(s)$.
 - d) Apply the final value theorem to find $\lim_{t \rightarrow \infty} v_o(t)$.

4.



Note: The 1A in the $i_g(t)$ source is always on.

- a) Write the Laplace transform $I_g(s)$ of $i_g(t)$.
 - b) Write the Laplace transform $V_o(s)$ of $v_o(t)$. Be sure to include the effects of initial conditions, if they are nonzero.
- 5.
- c) Write a numerical time-domain expression for $v_o(t)$ where $t \geq 0$.