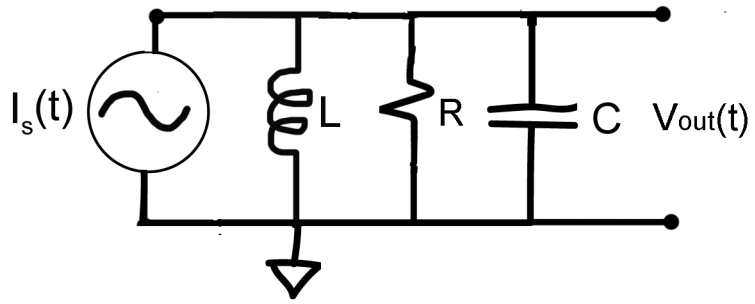
Homework 5 - Physics 39 L (2026)

The parallel RCL circuit below is excited by an input $I_s(t)$.



(1) Write a differential equation for $V_{out}(t)$. Identify scales ω_o, τ_L, τ_R.
(2) Write an algebraic equation for $V_{out}(\omega)$.
(3) What is the asymptotic frequency dependence, in terms of magnitude and phase, of $V_{out}(\omega)/I_s(\omega)$ as $\omega \rightarrow 0$? As $\omega \rightarrow \infty$?
(4) Solve for the steady-state value of $V_{out}(t)$ for a sinusoidal input, i.e., $I_s(t) = I_o \sin \omega t$.