PROGRAMMING ASSIGNMENT 4:
RLC CIRCUITS

Write a program to solve the RLC circuit problem for arbitrary q_0, i_0, R, L, C, $\mathcal{E}_0$, and ω_d using the Verlet algorithm.

- Show that
  - it demonstrates simple harmonic behavior if $R = \mathcal{E}_0 = 0$.
  - it demonstrates overdamping/underdamping/critical damping for appropriate values of R, L, and C if $\mathcal{E}_0 = 0$.
  - it demonstrates both transient and steady-state behavior.
  - it demonstrates inductive, capacitive, and resonance behavior for appropriate values of R, L, and C.
- Generate plots of: $q(t)$ (charge), $i(t)$ (current), $V_R(t)$ (voltage drop across the resistor), $V_{RLC}(t)$ (voltage drop across the whole circuit), $E_C(t)$ (energy stored in the capacitor), $E_L(t)$ (energy stored in the inductor), and $E(t)$ (total energy).