Demo: Levitating coil

\[ I_{AC} = I_0 \sin(\omega t) \]

\[ I_{ind} \sim -\frac{d\Phi_B}{dt} \sim -\cos(\omega t + \phi) \]

Without delay (\( \phi = 0 \)):
No net force

With delay (\( \phi < 0 \)):
Net repulsion (currents are opposite most of the time)
Demo: RL circuit

First: No L

Then: Large L (30H)

Demo: RL circuit

First: No L - no delay between I and V

Then: Large L (30H)
Demo: RL circuit

Then: Large L (30H)

Demo: RL circuit

Then: Large L (30H) - Delay in I

Demo: RL circuit

Then: Open second switch -> “Back EMF” keeps current going (large induced EMF)

Demo: RL circuit

Energy stored in B-field is transformed into heat and light in R and bulb III