

NAME

1. In the plinko applet explain why the balls fall in the pattern shown.
2. Explain how the self inductance varies with the number of turns.
3. A rail gun is constructed as shown. Derive an expression for how the circuit behaves and another one for how the rail moves. Please make explicit the dependence of each parameter in these equations on other variables. That is, if a capacitance appears as C then I interpret that as it having no other dependence (for example time, voltage, etc.).

4. An oscillating current $I(t)$ is applied to a circular capacitor. First draw a path over which to apply Ampere's law inside the capacitor and apply it in a side view of the capacitor. Assume $\vec{B} = \mu_0 I(t) s / (2A) \hat{\phi}$ where A is the area of the capacitor and s is the radial distance from the symmetry axis.

5. Assume that the theory of gravity is analogous to that of electricity and magnetism. For the analogous magnetic forces what do you expect to happen to a satellite orbiting a rotating planet with the axis of rotation of both along the same direction and explain the analogy.