

Lenz's Law

A fanatic is one who can't change his mind and won't change the subject.

Churchill

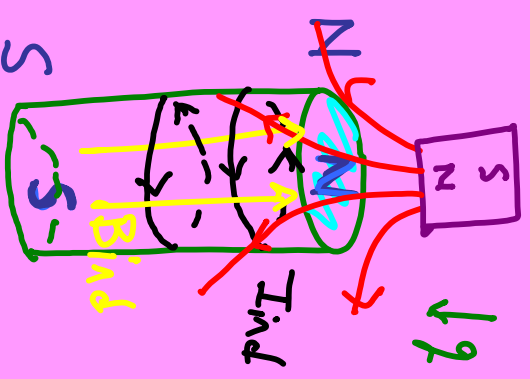
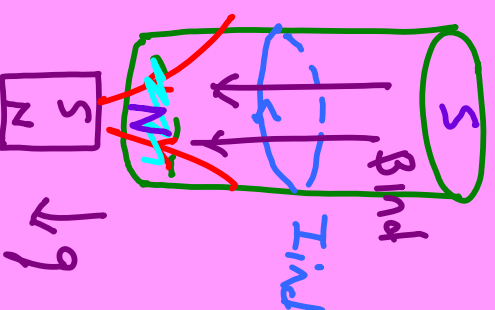
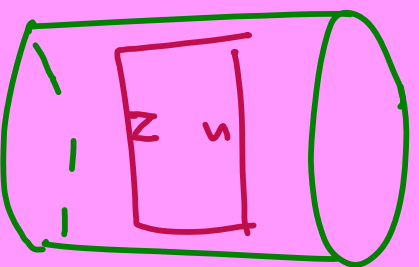
$$\mathcal{E} = -N \frac{d\Phi_B}{dt}$$

Faraday's law

Lenz's Law

- Lenz's Law states that the polarity of the induced *emf* is such that it tends to produce a current that creates a B-field to oppose the change in magnetic flux through the area enclosed by the current loop.

- Lenz's Law Demos



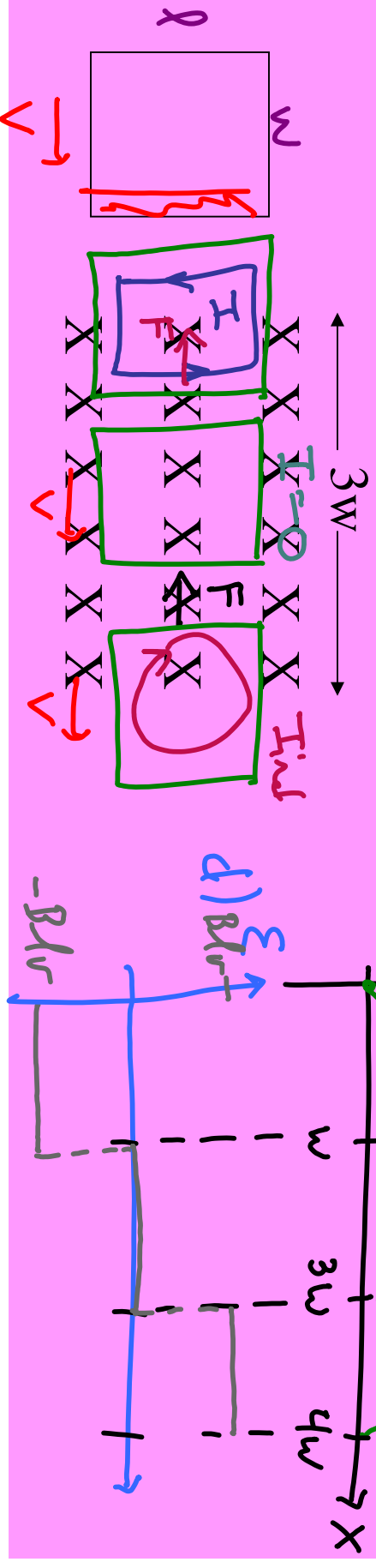
Example

A rectangular loop of length, ℓ , and width, w , and resistance, R , moves with a constant velocity, v , to the right, and passes through a uniform B -field that has a width of $3w$.

- Determine the direction of the initial induced current in the loop. **ccw**
- Determine the direction of the force when the loop enters the region with the B -field.

Plot as functions of x

- the magnetic flux through the loop
- the induced motional emf



Lenz's EXamples

1. The magnet is pulled to the left. What is the direction of the induced current in the loop?
2. If the coil was moved to the right, what would be the direction of the induced current?
3. A coil of wire is in a region where the magnetic field is going into the page. What is the direction of the induced current if the magnetic field is decreasing?

