Summary of Hand Rules

June 11, 2021 9:28 AM

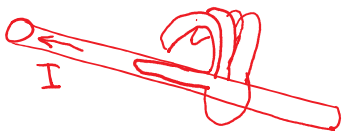
RHR → + charge flow (I)

LHR → − charge flow

⊙ out of page

⊗ into page

Mag. field around a wire

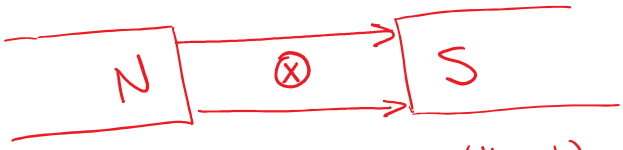


- thumb points in direction of current
- fingers curl around wire showing cw or ccw mag. field

Mag field in a solenoid

- thumb in direction of current on end coil
- fingers curl around that coil (as for wire) but will point S to N inside the coil

Wire or charge in an external magnetic field



$\vec{I}$ is into the page (thumb)
$\vec{B}$ is N to S (straight fingers)
$\vec{F}$ is down (palm facing down) on the wire or charge

your hand has 3 dimensions:

thumb ⊥ fingers ⊥ palm

Lenz's Law (ornary)

- when moving a conductor through a magnetic field to create a current

↳ the current that is created will create a mag. field

that opposes the motion creating the current.

① magnet into solenoid

→ created I creates a $\vec{B}$ in solenoid that opposes motion of magnet.

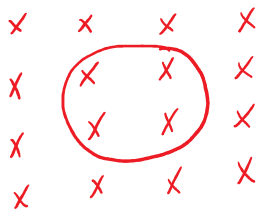
created so repels incoming magnet.

② wire (attached to circuit) moving in $\vec{B}$

note: entire circuit is not in $\vec{B}$

to find direction of current
put fingers in direction of $\vec{B}$
and palm opposite v direction
then thumb points in direction of current along moving wire

③ Loop entirely in $\vec{B}$



new RHR:
thumb points in direction of $\vec{B}$
fingers curl around loop in direction of current

Always think about how $\vec{B}$ is changing:

ex if loop is shrinking, then $\vec{B}$ into page is less, so Lenz's says a current is created to increase $\vec{B}$ into the page.
→ thumb into page
→ fingers curl CW.

ex if $\vec{B}$ strength increases into page ↑, then Lenz's says current created will decrease $\vec{B}$ into page. (or increase $\vec{B}$ out of the page)

→ thumb points out of page
→ fingers curl ccw.