Bio- savarts law

dB = (KIdLsintheta)/r^2 K = 1/(4pi epsilon)

dB = magnetic field iunduction strength

theta = angle between IdL and r

1 webm^-2 = 1 tesla = (10)^4 gauss

10 ampere = 1 biot

Cgs K = 1 (gauss cm)/(biot)

Vector form

Vec (dB) = mu\_{0}/(4pi) (I(vec (dL) xx hat r) /r^2 hat r = vec r/abs(r)

Vec (dB) = mu\_{0}/(4pi) (I(vec (dL) xx vec r) /r^3

Vec (dL) xx hat r = dLabs(hat r)sintheta = dLsinthta

Vec (dL) xx vec r = dLrsintheta

Direction of magnetic field

I is clockwise

Magnetic field is inward , acts a south pole

M is inward

M is magnetic dipole moment

M = nIA

I is anticlockwise

B is inoutward direction, acts like north pole

M is outward

Electric dipole moment is from -ve to +ve

Magnetic dipole moment is from south to north

Magnetic field due to a moving charge at a point

B = mu\_{0}/(4pi) (qvsintheta)/r^2

Magnetic field at a point due to current carrying wire

1. Finite length styraight wire

B = (mu\_{0}I) /(4pir) (sinphi\_{1} + sinphi\_{2})

1. Infinite length wire

B = (mu\_{0}I)/(2pir)

1. Near one end of infinite length conductor

B = (mu\_{0}I)/(4pir)

1. P[oint below

B = (mu\_{0}I)/(4pir) [sinphi\_{1} + sinphi\_{2}]

Magnetic field at center of square loop of side length a

B = (mu\_{0}I)/(4sqrt(2)pia)

Magnetic field due to current carrying arc at centre( phi is the angle of sector)

B = (mu\_{0}I)/(4pir) phi

Magnetic field at axial point of current carrying wire is 0

Magnetic field due to a circular current carrying loop at a axial point

B = (mu\_{0}IR^2)/(2(R^2 + r^2)^(3/2)) R = radius of circle loop

r = distance from center

direction of magnetic field same on both sides of loop

diection of electric field in both sides are opposite to each other

graph B-r

motion ofcharged partice in magnetic field

F = q(v xx B) = qvbsintheta

Right screw rule

θ

B

A

Keep fingers parallel to A and curl to B the direction of thumb is C C = A xx B

Direction of magnetic force

1. Fleming left hand

(only if v and B are perpendicular or else screw rule)

C = vec A xx vecB C = thumb A = middle B = forefinger

1. Right palm rule

F = q(v xx B)