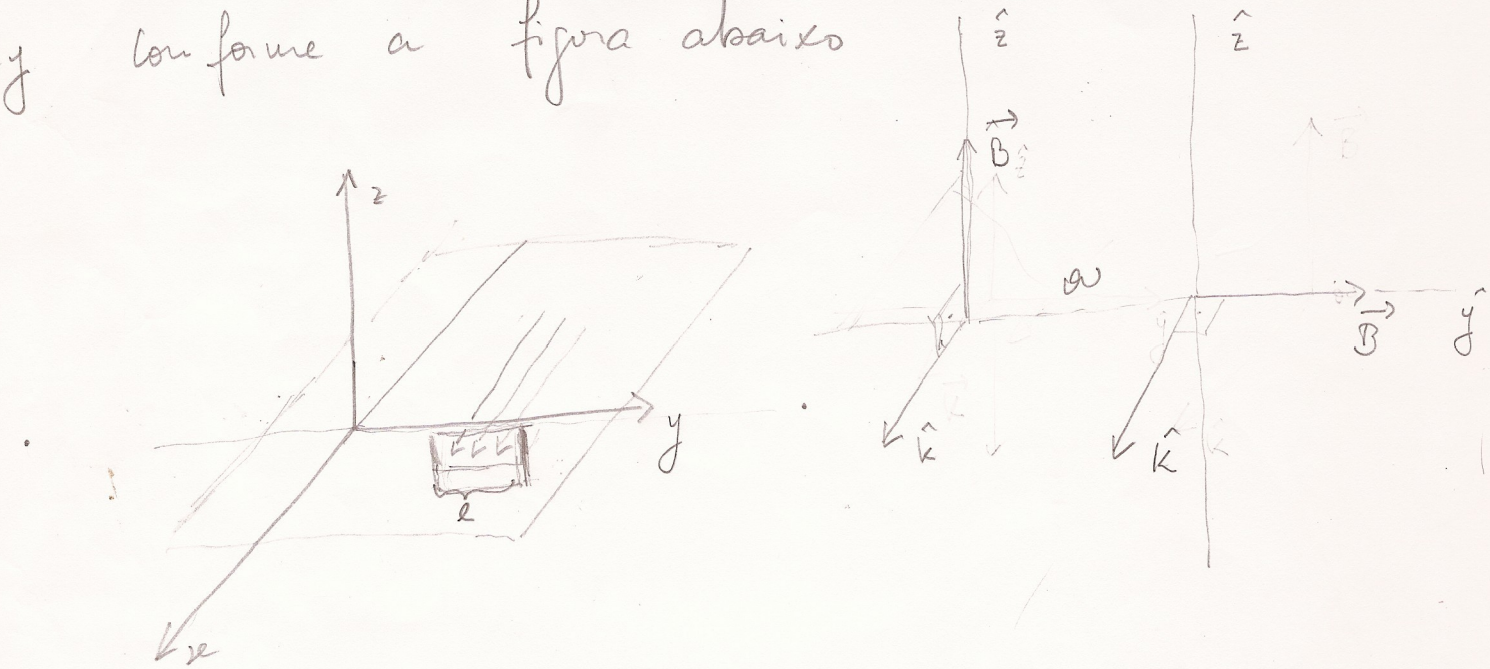
Aula nº 17

Exemplo 3

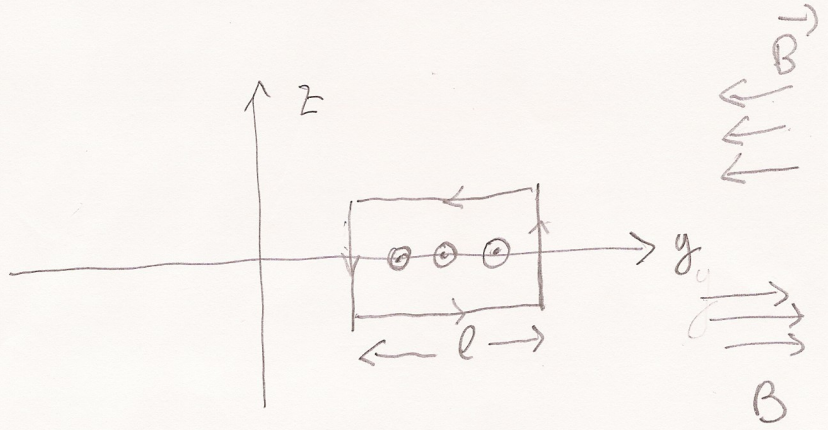
Encontre o campo magnético de uma corrente superficial uniforme finita $\vec{K} = K\hat{x}$ fluindo sobre o plano xy conforme a figura abaixo



Direção $\hat{z}$ não é possível contribuições vindas de pts y anulariam contribuições de pts $-y$

$$\oint \vec{B}\cdot d\vec{\ell} = 2B\ell = \mu_0 I_{enc} = \mu_0 K \ell$$

$$B = \frac{\mu_0 K}{2}$$



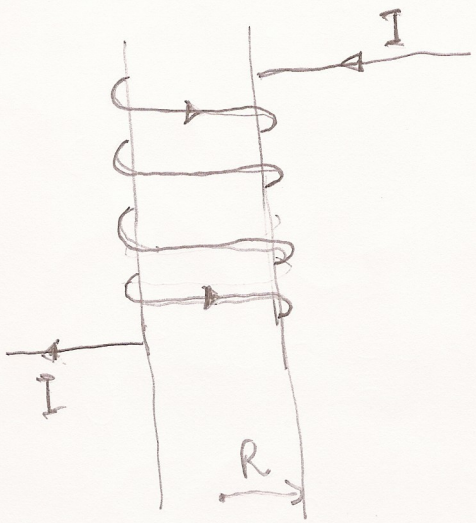
Ou mais precisamente

$$\vec{B} = \begin{cases} +\mu_0/2\, K\, \hat{y} & p/\ z < 0 \\ -\mu_0/2\, K\, \hat{y} & p/\ z > 0 \end{cases}$$

Exemplo 5.9

Equivalente a uma corrente $K = nI$

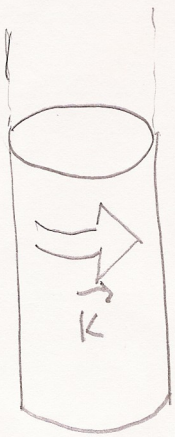
- n = nº de voltas p/ unidade de comprimento (nº de espiras)

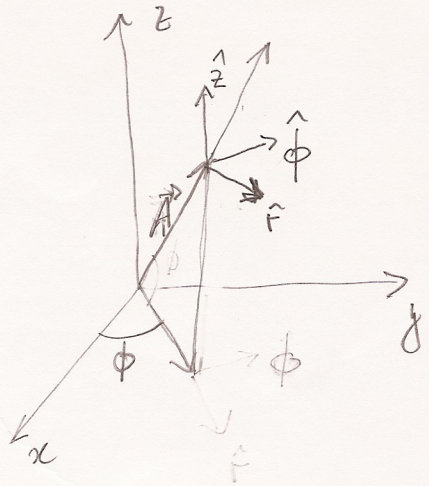


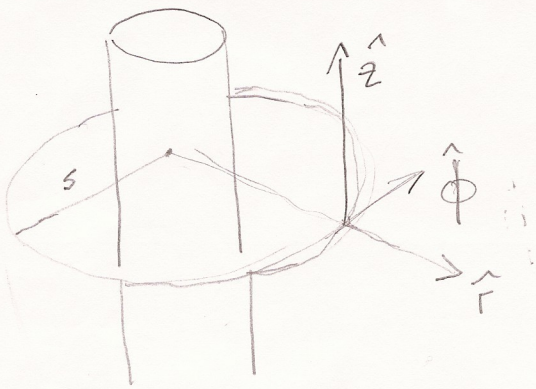
- Corrente estacionaria I

- Raio do Cilindro R

Componente radial do campo magnético $B_r = 0$



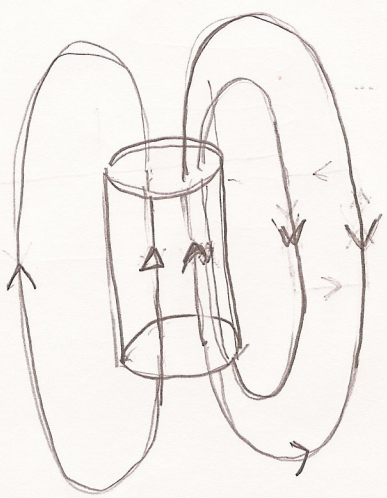


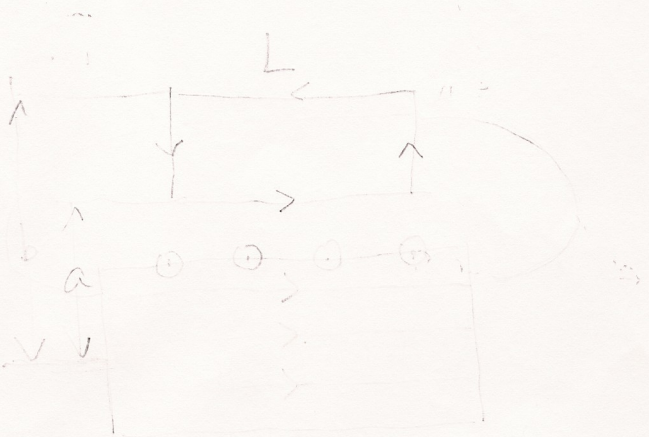


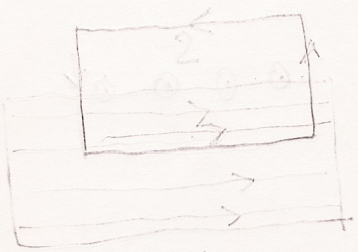
$$\oint \vec{B} \cdot d\vec{\ell} = B_\phi \, 2\pi s = \mu_0 I_{enc}$$

$$= 0$$

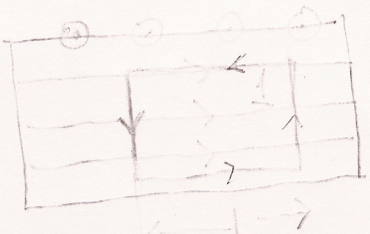
o loop não enfeixa corrente elétrica !







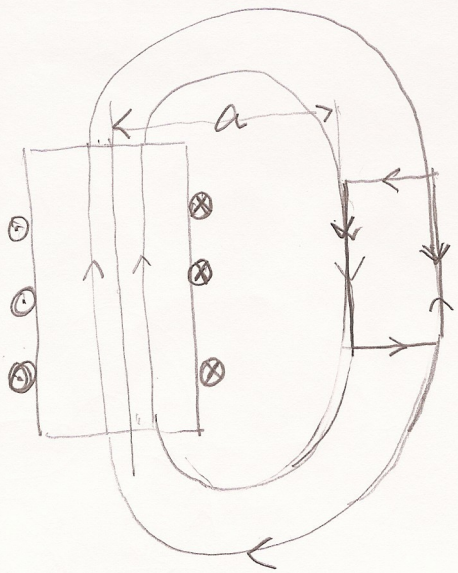
(2)



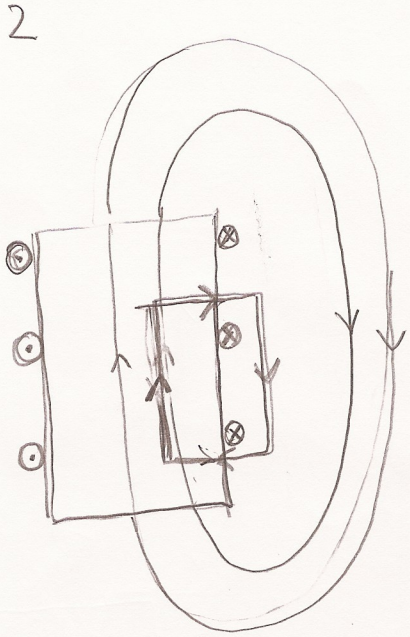
(1)

Loop 1 : (ver figura abaixo)

$$\oint \vec{B} \cdot d\vec{l} = [B(a) - B(b)]L = 0 \Longrightarrow B(a) = B(b)$$



Loop 2



$$\oint \vec{B} \cdot d\vec{l} = (\underbrace{i n L}_{\text{corrente total}}) \mu_0$$