Universidade Federal do Rio de Janeiro | Instituto de Física

Física III | 2017/2

Lista 7 - Fontes de Campo Magnético

Prof. Elvis Soares

1. (a) $\Phi_B^{(\text{face})} = B_x L^2$
   (b) $\Phi_B^{(\text{tot})} = 0$.

2. (a) $\vec{\boldsymbol{B}}(s) = \dfrac{\mu_0 I}{4\pi} \dfrac{L}{s[(L/2)^2 + s^2]^{1/2}} \hat{\boldsymbol{\phi}}$.

   (b) $\lim\limits_{L \gg s} \vec{\boldsymbol{B}}(s) = \dfrac{\mu_0 I}{2\pi s} \hat{\boldsymbol{\phi}}$.

   (c) Mesma resposta do item (b).

3. $\vec{\boldsymbol{B}}(\mathcal{O}) = \dfrac{\mu_0 I}{12} \dfrac{(b-a)}{ab} \hat{\boldsymbol{z}}$.

4. (a) $\vec{\boldsymbol{B}}(s < R) = \dfrac{\mu_0 I_{\text{int}}}{2\pi s} \hat{\boldsymbol{\phi}}$.

   (b) $\vec{\boldsymbol{B}}(s > R) = \dfrac{\mu_0 (I_{\text{int}} - I_{\text{ext}})}{2\pi s} \hat{\boldsymbol{\phi}}$.

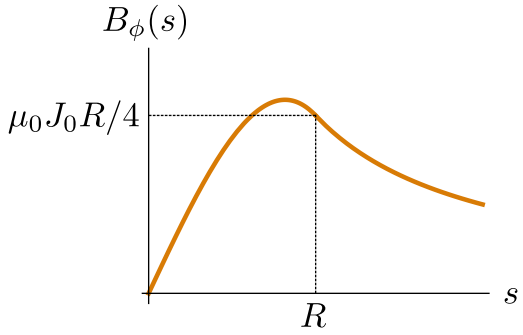
   (c) $\vec{\boldsymbol{B}}(s < R) = \dfrac{\mu_0 I_{\text{int}}}{2\pi s} \hat{\boldsymbol{\phi}}$ e
   $\vec{\boldsymbol{B}}(s > R) = 0$.

5. (a) $I = \dfrac{J_0 \pi R^2}{2}$

   (b) $\vec{\boldsymbol{B}}(s < R) = \dfrac{\mu_0 J_0}{2} s \left(1 - \dfrac{s^2}{2R^2}\right) \hat{\boldsymbol{\phi}}$.

   (c) $\vec{\boldsymbol{B}}(s > R) = \dfrac{\mu_0 J_0 R^2}{4s} \hat{\boldsymbol{\phi}}$.

   (d)



6. $\vec{\boldsymbol{B}}(s < R) = \mu_0 n I \hat{\boldsymbol{z}}$ e $\vec{\boldsymbol{B}}(s > R) = 0$.

7. $F = \dfrac{\mu_0 I_1 I_2 ab}{2\pi d(d+a)}$, horizontal para esquerda.

8. (a) $I = \lambda R \omega$.

   (b) $\vec{\boldsymbol{\tau}} = \lambda \pi R^3 \vec{\boldsymbol{\omega}} \times \vec{\boldsymbol{B}}_{\text{ext}}$.

   (c) $\vec{\boldsymbol{B}}(\mathcal{O}) = \dfrac{\mu_0 \lambda}{2} \vec{\boldsymbol{\omega}}$.

   (d) $\vec{\boldsymbol{\mu}} = \lambda \pi R^3 \vec{\boldsymbol{\omega}}$.

9. Mostre!