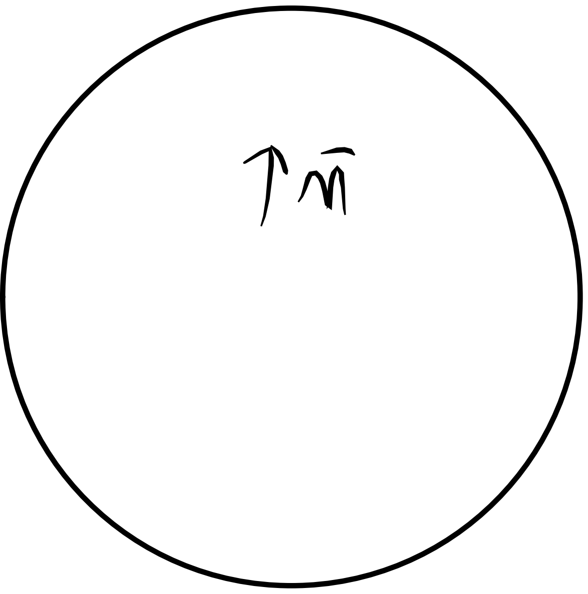


$\bar M = M \bar e_z$ dla $r \le R$

$\bar B = \mu_0 (H + M) \; / \bar\nabla \cdot$

$j_{sw.} = 0 \Rightarrow \bar\nabla \times \bar H = 0$

$0 = \mu_0 (\bar\nabla H + \bar\nabla M)$

$\bar j_{zw} = \bar\nabla \times \bar M$

$\bar\nabla \cdot \bar H = - \bar\nabla \cdot \bar M$

$\bar H = - \bar\nabla \bar\Phi_m$

$- \underline{\bar\nabla \bar H} = \bar\nabla (\bar\nabla \bar\Phi_m) = \Delta \bar\Phi_m$

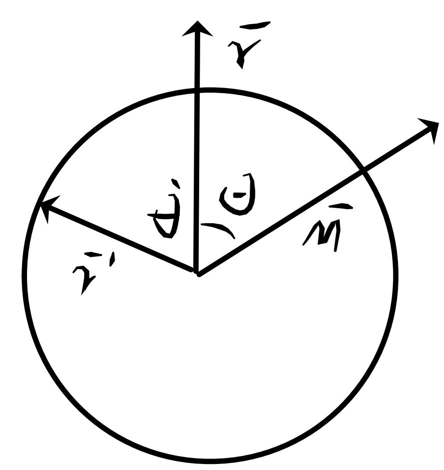
$\underline{\bar\nabla \cdot \bar M} = - \rho_m$

skok M

$\sigma_m = - M_\perp^+ + M_\perp^- = M_\perp = \bar M \cdot \bar n$

$$\Delta \Phi_m = - \rho_m \Rightarrow \Phi_m = \frac{1}{4\pi} \int_V \frac{\rho_m \, d^3 r}{|\bar r - \bar r'|}$$

$$\bar M = M \begin{bmatrix} \sin\theta \\ 0 \\ \cos\theta \end{bmatrix} \qquad \bar n = \begin{bmatrix} \sin\theta' \cos\varphi \\ \sin\theta' \sin\varphi \\ \cos\theta' \end{bmatrix}$$



$$\bar M \cdot \bar n = M (\sin\theta \cos\varphi \sin\theta' + \cos\theta \cos\theta')$$

$$\Phi_m = \frac{1}{4\pi} \int_{S(R)} \frac{\sigma_m}{|\bar r - \bar r'|} ds' = \frac{MR^2}{2} \int_0^{\pi} \frac{\cos\theta \cos\theta' \sin\theta'}{|\bar r - \bar r'|} d\theta = \begin{cases} \frac{M}{3} r \cos\theta & r < R \\ \frac{M}{3} \frac{R^3}{r^2} \cos\theta & r > R \end{cases}$$

$$H = - \bar\nabla \Phi_m$$

$r < R$

$$\bar H = - \bar\nabla \left(\frac{M}{3} z \right) = \begin{bmatrix} 0 \\ 0 \\ -\frac{M}{3} \end{bmatrix}$$

$r > R$

$$\bar H = - \bar\nabla \left(\frac{MR^3}{3 r^2} \cos\theta \right) = - \frac{R^3}{3} \left(\bar\nabla \left(\bar M \cdot \frac{\bar r}{r^3} \right) \right)$$

$$\bar B = \mu_0 (\bar H + \bar M)$$

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