Da intensità di corrente in poi + Prodotto vettore

Pag 405 n 6

$d = 2{,}2\ cm \approx 2{,}2 \cdot 10^{-3}\ m$ F sul tratto

$i_1 = 3{,}8A$

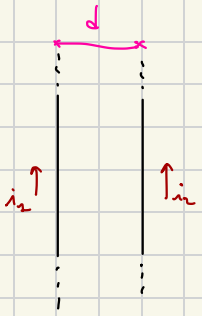
$i_2 = 7{,}5A$

$\ell = 2m$

$\mu_0 = 4\pi \cdot 10^{-7} \frac{N}{A^2}$

$F = \frac{\mu_0}{2\pi} \frac{i_1 i_2}{d} \ell \approx 5{,}2 \cdot 10^{-4}\ N$

14



$d = 0{,}32m$

$i_1 = i_2 = i = 1{,}7A$

$F = 9{,}5 \cdot 10^{-6}\ N$

(1) $\ell = ?$

(2) ⇝ Supponi ℓ raddoppi che succede la forza

$F = \frac{\mu_0}{2\pi} \frac{i_1 \cdot i_2}{d} \cdot \ell$

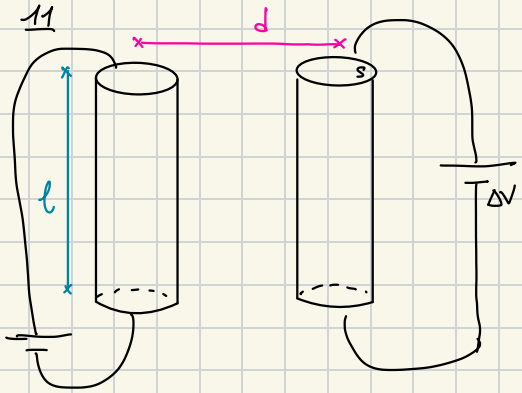
⇝ $\ell = \frac{F \cdot d \cdot 2\pi}{i_1 i_2 \mu_0} \approx 5{,}3m$

⇝ se $\ell \rightsquigarrow 2\ell$

$F_N = \frac{\mu_0}{2\pi} \frac{i_1 i_2}{d} 2\ell$

$F_N = 2 \cdot \underbrace{\frac{\mu_0}{2\pi} \frac{i_1 i_2}{d} \cdot \ell}_{F} \Rightarrow F_N = 2F$

11



$S = 3\ mm^2$ $\quad \Delta V = 20mV$

$l = 1,2\ m$

Sono nel vuoto $\quad \rho_{Cu} = 1,7 \cdot 10^{-8}\ \Omega \cdot m$

$d = 0,43\ m$

$F_{magnetica}$

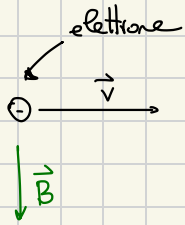
$$F = \frac{\mu_0}{2\pi} \cdot \frac{i_1 i_2}{d} l$$

Dalla I Legge di Ohm $\quad \Delta V = iR$

Dalla II legge di Ohm $\quad R = \rho_{Cu} \cdot \frac{l}{S}$

$$\Rightarrow i = \frac{\Delta V}{R} = \frac{\Delta V}{\rho_{Cu}} \cdot \frac{S}{l} \quad \Rightarrow F = \frac{\mu_0}{2\pi} \cdot \frac{\Delta V^2 \cdot S^2}{\rho_{Cu}^2 \cdot l^2} \cdot \frac{l}{d} \approx 4,8 \cdot 10^{-6}\ N$$

47:



$v = \frac{c}{10}$ ← $300000\ \frac{km}{s}$

$B = 4,8 \cdot 10^{-5}\ T$

Modulo di F su e

$$\vec{F} = q\,|\vec{v} \wedge \vec{B}|$$

modulo

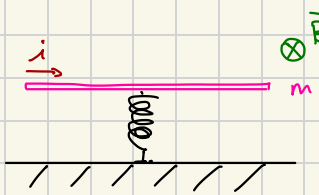
$$F = |q| \cdot vB \sin\alpha = |e| \cdot vB \approx 2,3 \cdot 10^{-16}\ N$$

56

$m = 10{,}2\ g$ $\quad i = 60\ A$

$\ell = 10\ cm$

$k = ?$

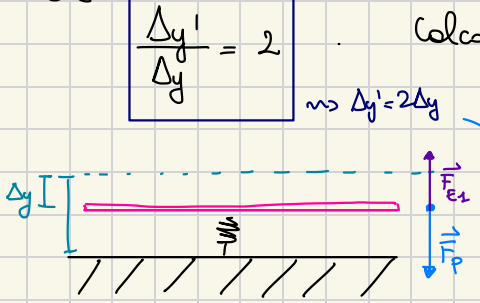


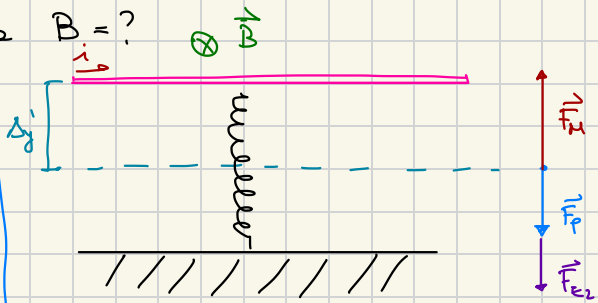
Solo per il peso della sbarra, la molla si comprime di $\Delta y = ?$

Dopo l'accensione di tutto subisce allungamento di $\Delta y'$ e vale che

$$\frac{\Delta y'}{\Delta y} = 2 \quad \rightsquigarrow \Delta y' = 2\Delta y$$

Calcola $B = ?$





$$\vec{F}_P + \vec{F}_{E1} = 0$$

$$mg = k\Delta y$$

$$\vec{F}_P + \vec{F}_{E2} + \vec{F}_M = 0$$

$$mg + k\Delta y' = Bi\ell$$

$$mg + k(2\Delta y) = Bi\ell$$

$$mg + 2k\Delta y = Bi\ell$$

$$mg + 2mg = Bi\ell \quad \rightsquigarrow \quad \boxed{B = \frac{3mg}{i\ell}}$$