

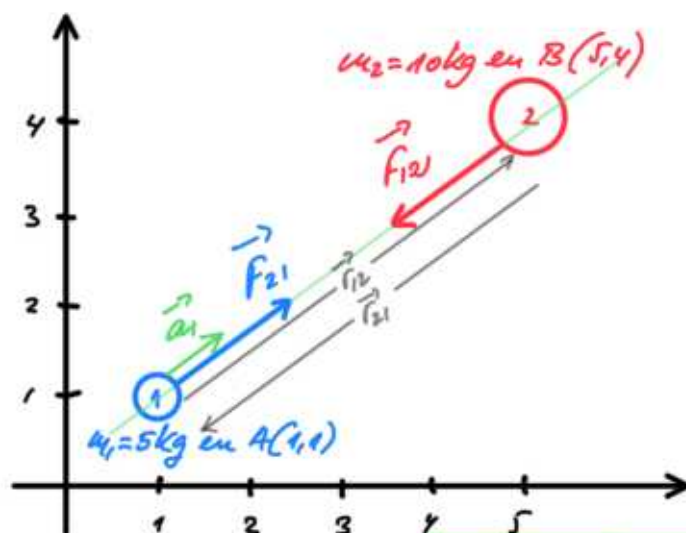
EXERCÍCIO FQ18E3362:

"achimagetec.com"

$m_1 = 5 \text{ kg}$ em $A(1,1)$
 $m_2 = 10 \text{ kg}$ em $B(5,4)$
 $G = 6,67 \cdot 10^{-11} \text{ u.s.s.}$

a) $\vec{a}_1$ e $\vec{a}_2$?
b) $\vec{F}_{12}$ e $\vec{F}_{21}$?
c) $\vec{F}_{21}$ e $\vec{F}_{12}$?
d) $\vec{a}_1$ e $\vec{a}_2$?

a) Diagrama:



b) $\vec{F}_{12} = -G \frac{m_1 m_2}{r_{12}^2} \frac{\vec{r}_{12}}{r_{12}} = \dots$

$$\vec{r}_{12} = 4\hat{x} + 3\hat{y}$$
$$|\vec{r}_{12}| = \sqrt{4^2 + 3^2} = 5 \text{ m}$$

$$= -6,67 \cdot 10^{-11} \frac{5 \cdot 10}{5^2} \frac{4\hat{x} + 3\hat{y}}{5} =$$

$$\vec{F}_{12} = -1,07 \cdot 10^{-10} \hat{x} - 8 \cdot 10^{-11} \hat{y} \text{ (N)}$$

$$|\vec{F}_{12}| = \sqrt{(-1,07 \cdot 10^{-10})^2 + (-8 \cdot 10^{-11})^2} = 1,34 \cdot 10^{-10} \text{ N} = F_{12}$$

c) $\vec{F}_{21} = 1,07 \cdot 10^{-10} \hat{x} + 8 \cdot 10^{-11} \hat{y} \text{ (N)}$

$$|\vec{F}_{21}| = 1,34 \cdot 10^{-10} \text{ N}$$

! Porque tienen mismo módulo y sentidos contrarios!

d) $\vec{F} = m \cdot \vec{a} \Rightarrow \vec{a}_1 = \frac{\vec{F}_{21}}{m_1} = \frac{1,07 \cdot 10^{-10} \hat{x} + 8 \cdot 10^{-11} \hat{y}}{5} \Rightarrow$

$$\vec{a}_1 = 2,14 \cdot 10^{-11} \hat{x} + 1,6 \cdot 10^{-11} \hat{y} \left(\frac{\text{m}}{\text{s}^2} \right)$$

$$|\vec{a}_1| = \sqrt{(2,14 \cdot 10^{-11})^2 + (1,6 \cdot 10^{-11})^2} = 2,68 \cdot 10^{-11} \text{ m/s}^2 = a_1$$