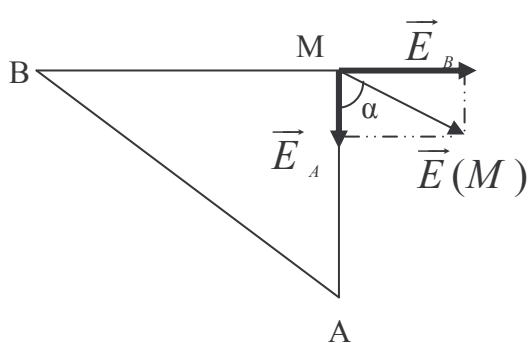


حل التمرين 05

.1

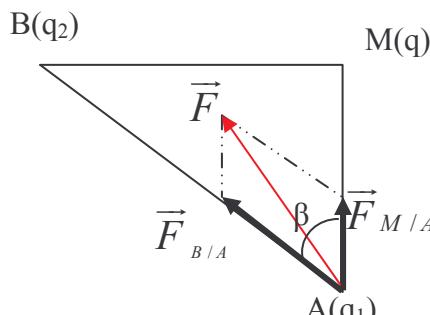


$$\begin{aligned}\vec{E}_A &= k \frac{q_1}{AM^2} \vec{u}_{AM} & \vec{E}_B &= k \frac{q_2}{BM^2} \vec{u}_{BM} \\ \vec{E} &= \vec{E}_A + \vec{E}_B \\ E^2 &= k^2 \frac{q_1^2}{AM^4} + k^2 \frac{q_2^2}{BM^4} \\ E &= k \sqrt{\frac{q_1^2}{AM^4} + \frac{q_2^2}{BM^4}}\end{aligned}$$

تطبيق عددي :

$$\begin{aligned}E &= 9.10^9 \sqrt{\frac{(10.10^{-9})^2}{(3.10^{-2})^4} + \frac{(40.10^{-9})^2}{(4.10^{-2})^4}} \\ E &= 2,5.10^5 V.m^{-1}\end{aligned}$$

$$\begin{aligned}\cos \alpha &= \frac{E_A}{E} \Rightarrow \cos \alpha = \frac{k |q_1|}{E \times AM^2} = \frac{k |q_1|}{E \times AM^2} \\ \cos \alpha &= 0,4 \Rightarrow \alpha = 66,4^\circ\end{aligned}$$



$$\vec{F} = q \vec{E} \Rightarrow F = qE \quad .2$$

تطبيق عددي :

$$\vec{F} = \vec{F}_{B/A} + \vec{F}_{M/A}$$

$$\vec{F} = k \frac{q_1 q_2}{AB^2} \vec{u}_{BA} + k \frac{q_1 q}{AM^2} \vec{u}_{MA}$$

$$F^2 = k^2 \frac{(q_1 q_2)^2}{AB^4} + k^2 \frac{(q_1 q)^2}{AM^4} + 2k^2 \frac{q_1^2 q q_2}{AB^2 AM^2} \cos \beta$$

$$F = k |q_1| \sqrt{\frac{q_2^2}{AB^4} + \frac{q^2}{AM^4} + 2 \frac{q q_2}{AB^2 AM^2} \cos \beta}$$

$$F = 2,2.10^{-6} N$$

.3