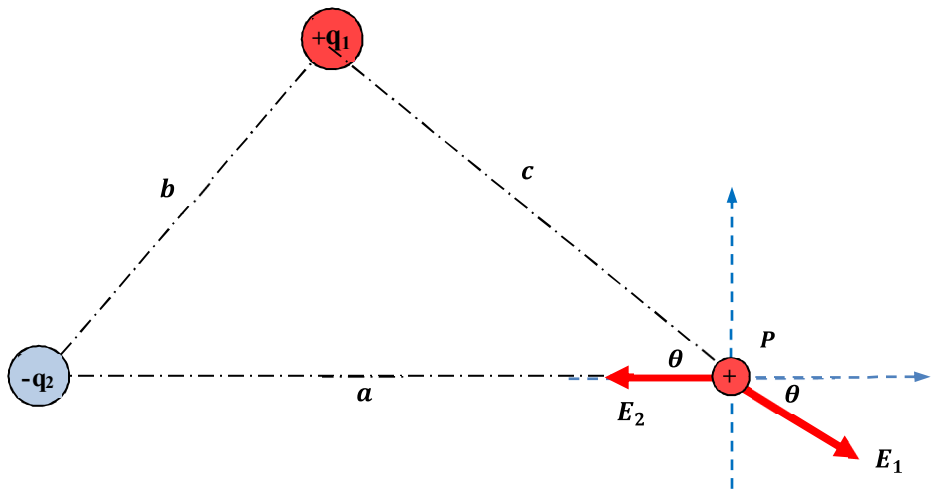
Ejemplo N°2.2

Dos cargas puntuales están ubicadas en dos vértices de un triángulo tal como se muestra en la figura, donde q1= -65 μC, q2= +80 μC, los lados del triángulo miden a = 90 cm, b = 60 cm. y c= 80 cm Determinar el campo eléctrico en el punto P ubicado en el tercer vértice del triángulo y la dirección del mismo respecto al eje x

Solución:

Datos

q_1 =-65 μC
q_2 = +80 μC
a= 0,9 m
b= 0,6 m
c= 0,8 m

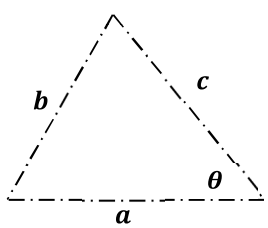


Calculo de los campos Ei

$$E_1 = k_o \cdot \frac{q_1}{r_1^2} = 9x10^9 \cdot \frac{65x10^{-6}}{(0,8)^2} \rightarrow E_1 = 9,141x10^5 \text{ N/C}$$

$$E_2 = k_o \cdot \frac{q_2}{r_2^2} = 9x10^9 \cdot \frac{80x10^{-6}}{(0,9)^2} \rightarrow E_2 = 8,889x10^5 \text{ N/C}$$

Calculo del angulo θ aplicando el teo. de cosenos



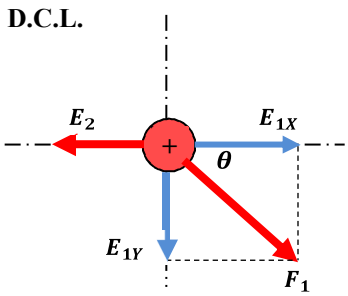
$$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\theta$$

$$\cos\theta = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c}$$

$$\cos\theta = \frac{(0,9)^2 + (0,8)^2 - (0,6)^2}{2 \cdot (0,9) \cdot (0,8)}$$

$$\theta = 40,804°$$

D.C.L.



Aplicando sumatoria de los vectores campo :

$$\sum E_X = E_X \qquad \sum E_Y = E_Y$$

$$E_{1X} - E_2 = E_X \qquad -E_{1Y} = E_Y$$

$$E_X = E_{1X} - E_2 \qquad -E_Y = E_{1Y}$$

$$E_X = 9,141x10^5.\cos(40,804°) - 8,889x10^5 \qquad E_Y = -9,141x10^5 sen(40,804°)$$

$$E_X = -1,970x10^5 \text{ N/C} \qquad E_Y = -5,973x10^5 \text{ N/C}$$

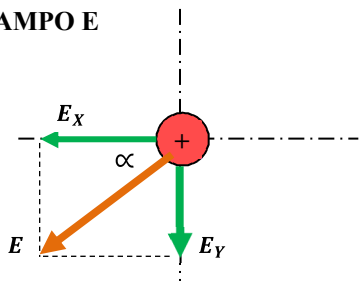
Calculo del campo resultante

$$E = \sqrt{(E_X)^2 + (E_Y)^2}$$

$$E = \sqrt{(-1,970x10^5)^2 + (-5,973x10^5)^2}$$

$$E = 6,289x10^5 \text{ N/C}$$

CAMPO E



Calculo de la direccion α de E

$$\text{Tan}\alpha = \frac{E_Y}{E_X} = \frac{-5,973x10^5}{-1,970x10^5} \rightarrow \alpha = 71,747°$$

Printed by BoltPDF (c) NCH Software. Free for non-commercial use only.