

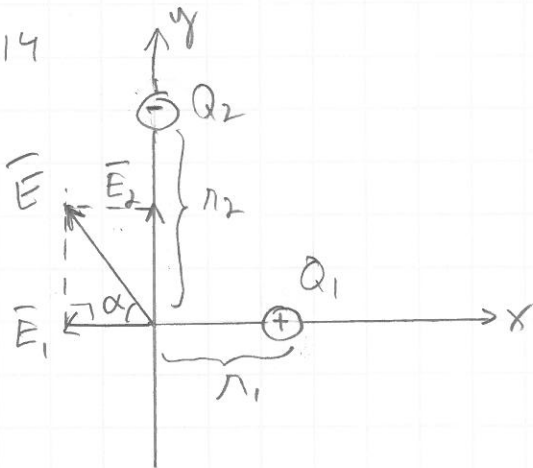
Varauksen $q > 0$ kohdistun sähköinen voima

$$F = k \frac{Qq}{r^2} = qE \quad | :q$$

$$\Rightarrow E = k \frac{Q}{r^2} \quad \text{PISTEVARAUKSEN SÄHKÖKENTTÄ (TYHJÖ)}$$

$$E = \frac{k}{\epsilon_n} \frac{Q}{r^2} \quad \text{ERISTE}$$

3.14



$$Q_1 = +1,5 \mu\text{C} \\ r_1 = 7,0 \text{ cm}$$

$$Q_2 = -6,5 \mu\text{C} \\ r_2 = 15 \text{ cm}$$

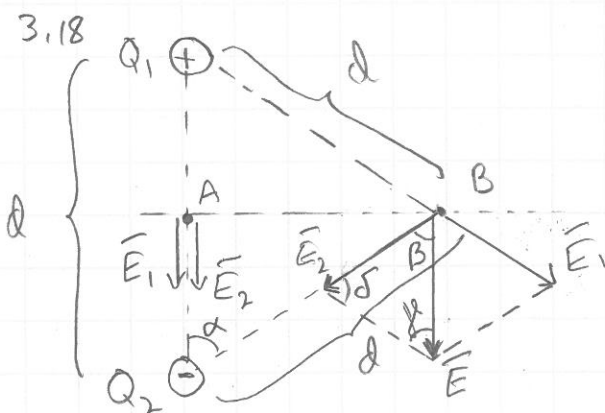
$$E_1 = k \frac{Q_1}{r_1^2} = 8,98755 \cdot 10^9 \frac{\text{N}}{\text{C}^2} \cdot \frac{1,5 \cdot 10^{-9} \text{C}}{(0,070 \text{ m})^2} \\ = 2,75129 \cdot 10^3 \frac{\text{N}}{\text{C}}$$

$$E_2 = \frac{kQ_2}{r_2^2} = \dots = 2,59640 \cdot 10^3 \frac{\text{N}}{\text{C}}$$

$$E = \sqrt{E_1^2 + E_2^2} = \dots = 3,78298 \cdot 10^3 \frac{\text{N}}{\text{C}} \approx \underline{3,8 \frac{\text{N}}{\text{C}}}$$

$$\tan \alpha = \frac{E_2}{E_1} \Rightarrow \alpha = 43,34^\circ \approx \underline{43^\circ}$$

3.18



$$Q_1 = +16 \mu\text{C}, \quad Q_2 = -16 \mu\text{C} \\ d = 14 \text{ cm}$$

$$A: E_1 = E_2 = k \frac{Q_1}{r^2} \\ \uparrow \\ \text{symmetria}$$

$$\vec{E}_1 \uparrow \vec{E}_2 \Rightarrow E = E_1 + E_2 = 2E_1$$

$$= 2 \cdot 8,98755 \cdot 10^9 \frac{\text{N}}{\text{C}^2} \cdot \frac{16 \cdot 10^{-9} \text{C}}{\left(\frac{0,14 \text{ m}}{2}\right)^2}$$

$$\approx 58654,2 \frac{\text{N}}{\text{C}} \approx \underline{59 \frac{\text{N}}{\text{C}}} \quad (\text{kohd. } Q_2 \text{ :sto})$$

symmetria

$$B: E_1 = E_2 = k \frac{Q_1}{d^2} = 7336,78 \frac{\text{N}}{\text{C}}$$

$$\text{Jasenneimen kulma (sivut } d) \Rightarrow \alpha = 60^\circ$$

$$\Rightarrow \beta = \alpha = 60^\circ \quad (\text{samankokoiset kulmat})$$