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$\vec{r}_1 = 2\hat{x} + 3\hat{y}$

$\vec{r}_2 = \vec{r}_p = 1\hat{x} + 5\hat{y}$

$\vec{r}_{ip} = \vec{r}_p - \vec{r}_i = (1-2)\hat{x} + (5-3)\hat{y}$

$= -1\hat{x} + 2\hat{y}$

$|\vec{r}_{ip}| = \sqrt{(-1)^2 + 2^2} = \sqrt{5} = 2.2$

$\vec{F}_{qpi} = k \frac{q_i q}{r_{ip}^3} \vec{r}_{ip} \frac{\vec{r}_{ip}}{|\vec{r}_{ip}|^3}$

$= \frac{\vec{r}_{ip}}{\vec{r}_{ip}^{3/2}}$

$\vec{F}_{pip}$

$\vec{E}$?

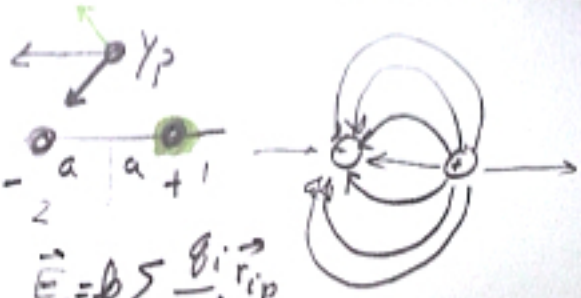
$$\vec{E} = \frac{\vec{F}_p}{q_p} \quad \left(\frac{N}{C}\right)$$

$$\vec{F} = q_p \vec{E}_p$$

$$\vec{E}_p = k \sum_{i=1}^{n} \frac{q_i \vec{r}_{ip}}{\vec{r}_{ip}^{\,3/2}}$$

$$= k \Sigma \frac{q_i \vec{r}_{ip}}{|r_{ip}|^3}$$

$$= k \Sigma \frac{q_i \hat{r}_{ip}}{\vec{r}_{ip}^{\,2}}$$



$$\vec{E}_p = k\sum \frac{q_i}{\vec{r}_{ip}^{\,2}}\vec{r}_{ip}$$

$$\vec{r}_1 = a\hat{x} + 0\hat{y}$$

$$\vec{r}_2 = -a\hat{x} + 0\hat{y}$$

$$\vec{r}_p = 0\hat{x} + y_p\hat{y}$$

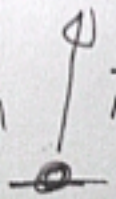
$$\vec{r}_{1p} = \vec{r}_p - \vec{r}_1 = -a\hat{x} + y_p\hat{y}$$

$$\vec{r}_{2p} = \vec{r}_p - \vec{r}_2 = a\hat{x} + y_p\hat{y}$$

$$\vec{E}_p = \frac{-2kqa}{[y_p^2 + a^2]^{3/2}} \hat{x}$$

$\div R^3 \quad \div y_p$

$$\vec{E}_p \approx \frac{-2kqa}{|y_p|^3} \hat{x}$$



$$\vec{p} = \sum_{i=1}^{n} q_i \vec{r}_i$$

$\vec{r}_1 = a\hat{x} \quad q_1 = +$

$\vec{r}_2 = -a\hat{x} \quad q_2 = -$

$$\vec{p} = (+q)(a\hat{x}) + (-q)(-a\hat{x})$$

$$\vec{p} = 2qa\hat{x} \qquad \vec{E} = \frac{-\vec{p}}{|y_p|^3}$$

$\vec{r}_p = x_p\hat{x} + y_p\hat{y}$

$\vec{r}_1 = a\hat{x} + 0\hat{y}$ $\quad \vec{E}_p = kq\sum_{i=1}^{2} \frac{\vec{r}_{ip}}{\vec{r}_{ip}^{\,3/2}}$

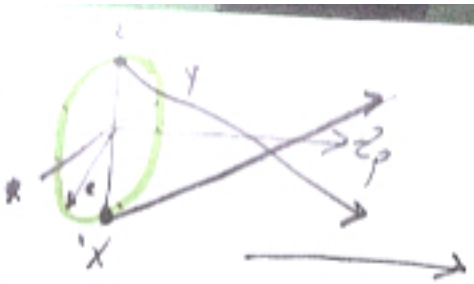
$\vec{r}_2 = -a\hat{x} + 0\hat{y}$

$\vec{r}_{1p} = \vec{r}_p - \vec{r}_1 = (x_p - a)\hat{x} + y_p\hat{y}$

$\vec{r}_{2p} = \vec{r}_p - \vec{r}_2 = (x_p + a)\hat{x} + y_p\hat{y}$

$$\vec{E}_p = kq\left[(+)\frac{\vec{r}_{1p}}{\vec{r}_{1p}^{\,3/2}} + (-)\frac{\vec{r}_{2p}}{\vec{r}_{2p}^{\,3/2}}\right]$$

$$= kq\left[(+)\frac{(x_p - a)\hat{x} + y_p\hat{y}}{\left[(x_p - a)^2 + y_p^2\right]^{3/2}} + (-)\frac{(x_p + a)\hat{x} + y_p\hat{y}}{\quad}\right]$$



$Q \quad \lambda = \frac{Q}{2\pi a}$

$r_1 = a\hat{x} + 0\hat{y} \qquad \vec{r}_p = z_p\hat{z}$

$r_2 = -a\hat{x} + 0\hat{y}$

$$E = k(\delta\cdot) \left[\frac{z_p\hat{z} - a\hat{x}}{[a^2 + z_p^2]^{3/2}} + \frac{z_p\hat{z} + a\hat{x}}{[a^2 + z_p^2]^{3/2}} \right]$$

$$\therefore \vec{E} = \frac{kQz_p\hat{z}}{-a^2 + z_p^2}$$

$$\vec{E}_p = \frac{kQz_p\hat{z}}{[a^2 + z_p^2]^{3/2}}$$

$$\frac{kQz_p\hat{z}}{z_p^{3/2}}$$