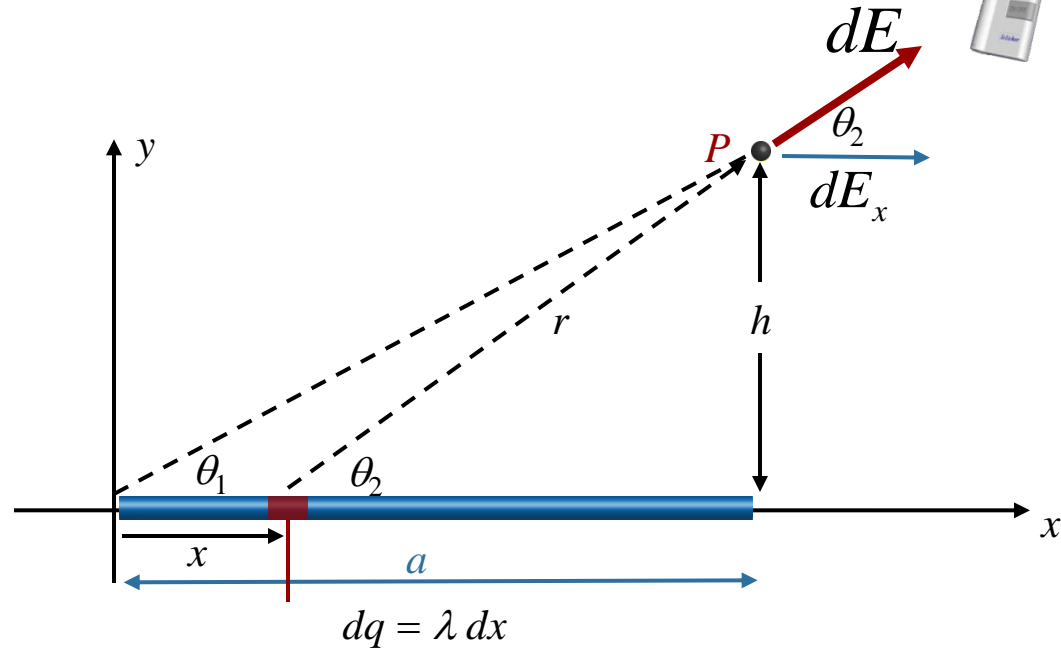


Calculation

Charge is uniformly distributed along the x -axis from the origin to $x = a$. The charge density is λ C/m. What is the x -component of the electric field at point P : $(x,y) = (a,h)$?



We know:

$$\vec{E} = \int k \frac{dq}{r^2} \hat{r}$$

$$\frac{dq}{r^2} = \frac{\lambda dx}{(a-x)^2 + h^2}$$

$$E_x = \int dE \cos \theta_2$$

What is E_x ?

$$\text{A) } \int_0^a \frac{k\lambda \cos \theta_2 dx}{(a-x)^2 + h^2}$$

$$\text{B) } \lambda k \cos \theta_2 \int_0^a \frac{dx}{h^2 + (x-a)^2}$$

C) A and B are both OK $\cos \theta_2$ **DEPENDS ON** x !