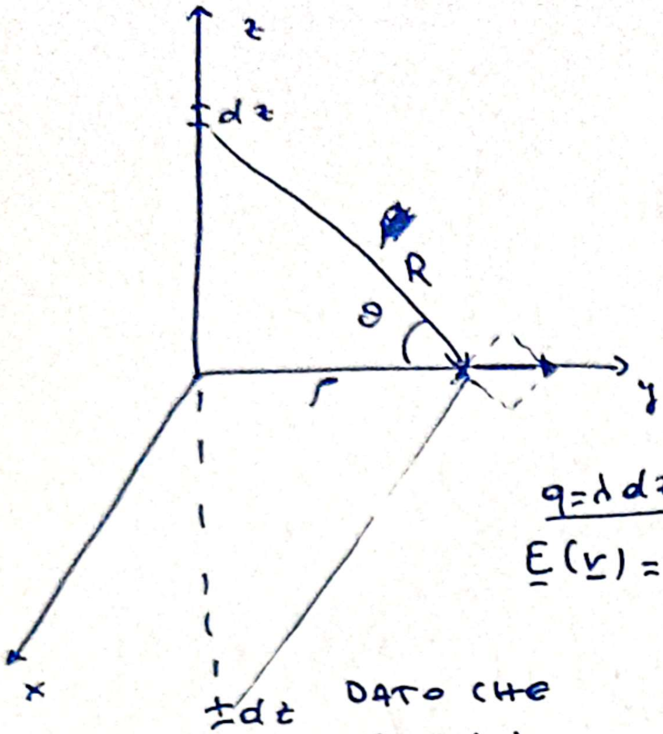

$q = \lambda \, dz'$

$$\underline{E}(\underline{r}) = k_e \cdot 2 \cdot \lambda \int_0^\infty \frac{\rho \, dz'}{\underbrace{(\rho^2+(z')^2)}^{3/2}} \hat{\rho}$$

DATO CHE

- $R\cos(\theta) = \rho$
- $R\sin(\theta) = z'$

$$\Rightarrow R = \frac{\rho}{\cos\theta} = \sqrt{\rho^2+(z')^2}$$

$$\frac{R\sin\theta}{R\cos\theta} = \frac{z'}{\rho} \Rightarrow z' = \rho \tan\theta \rightarrow$$ CAMBIO VARIABILI DA FARE.

$$\frac{dz'}{d\theta} = \rho \cdot \frac{1}{\cos^2\theta}$$

Gli estremi andranno da 0 e $\frac{\pi}{2}$

$$k_e 2\lambda \int_0^{\frac{\pi}{2}} \rho^2 \cdot \frac{1}{\cos^2\theta} \cdot \frac{1}{\left(\frac{\rho}{\cos\theta}\right)^3} d\theta = k_e 2\lambda \int_0^{\frac{\pi}{2}} \rho^2 \cdot \frac{1}{\cos^2\theta} \cdot \frac{\cos^3\theta}{\rho^3} \, d\theta$$

$$= \frac{k_e 2\lambda}{\rho} \int_0^{\frac{\pi}{2}} \cos\theta \, d\theta = \boxed{\frac{k_e 2\lambda}{\rho}}$$