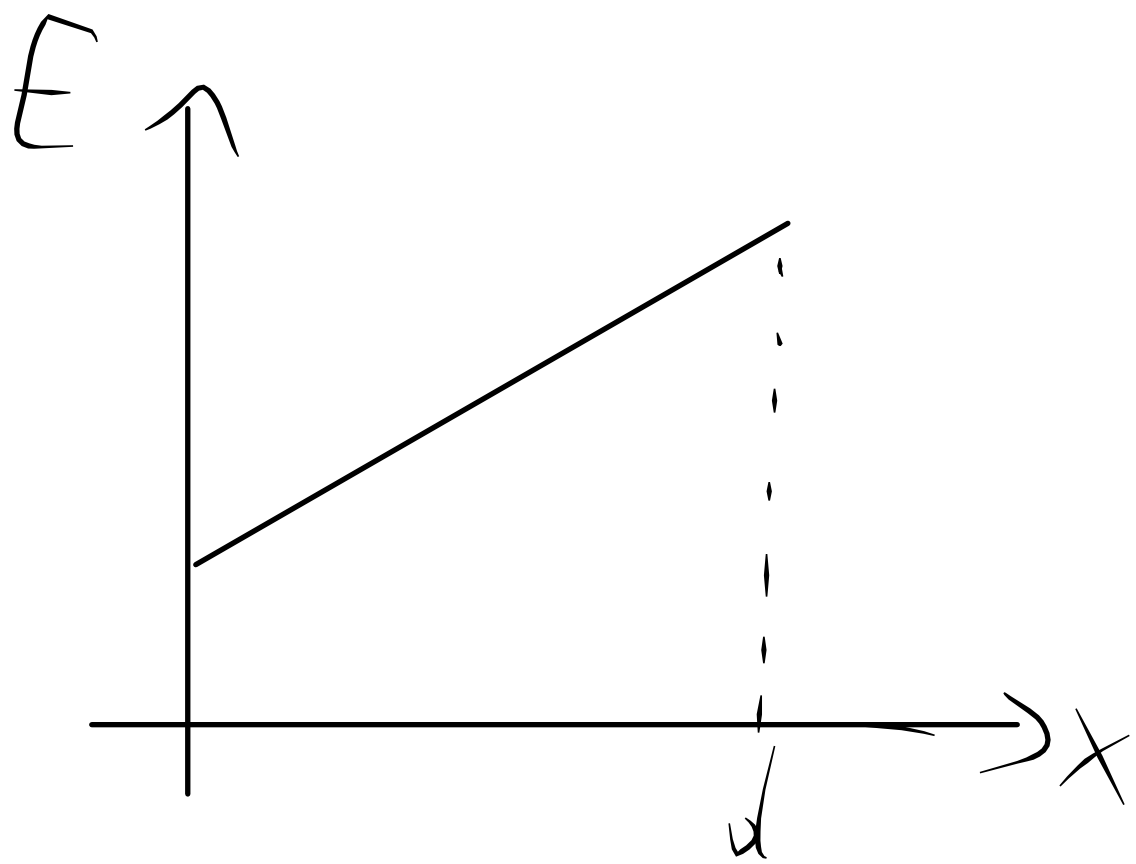


$$\vec{E} = P \vec{j}$$

$$P(x) = \frac{P_2 - P_1}{d} x + P_1$$



$$\vec{E} = \vec{j} \left(\frac{P_2 - P_1}{d} x - P_1 \right)$$

$$\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0}$$

$$\vec{j} = j \hat{e}_x$$

$$\nabla \cdot \left(\vec{j} \frac{P_2 - P_1}{d} x - P_1 \right) = \frac{\rho}{\epsilon_0}$$

$$j \frac{P_2 - P_1}{d} = \frac{\rho}{\epsilon_0}$$

$$j = \vec{j} \frac{P_2 - P_1}{d} \epsilon_0$$

$$E(0^+) - E(0^-) = j P_1 = \frac{\sigma_1}{\epsilon_0}$$

$$\sigma_1 = j P_1 \epsilon_0$$

$$E(d^+) - E(d^-) = -j P_2 = \frac{\sigma_2}{\epsilon_0}$$

$$\sigma_2 = -j P_2 \epsilon_0$$

$$Q_{\text{tot}} = \int \sigma_1 + \int j + \int \sigma_2 = \int j \epsilon_0 (P_1 - P_2 + P_2 - P_1) = 0$$