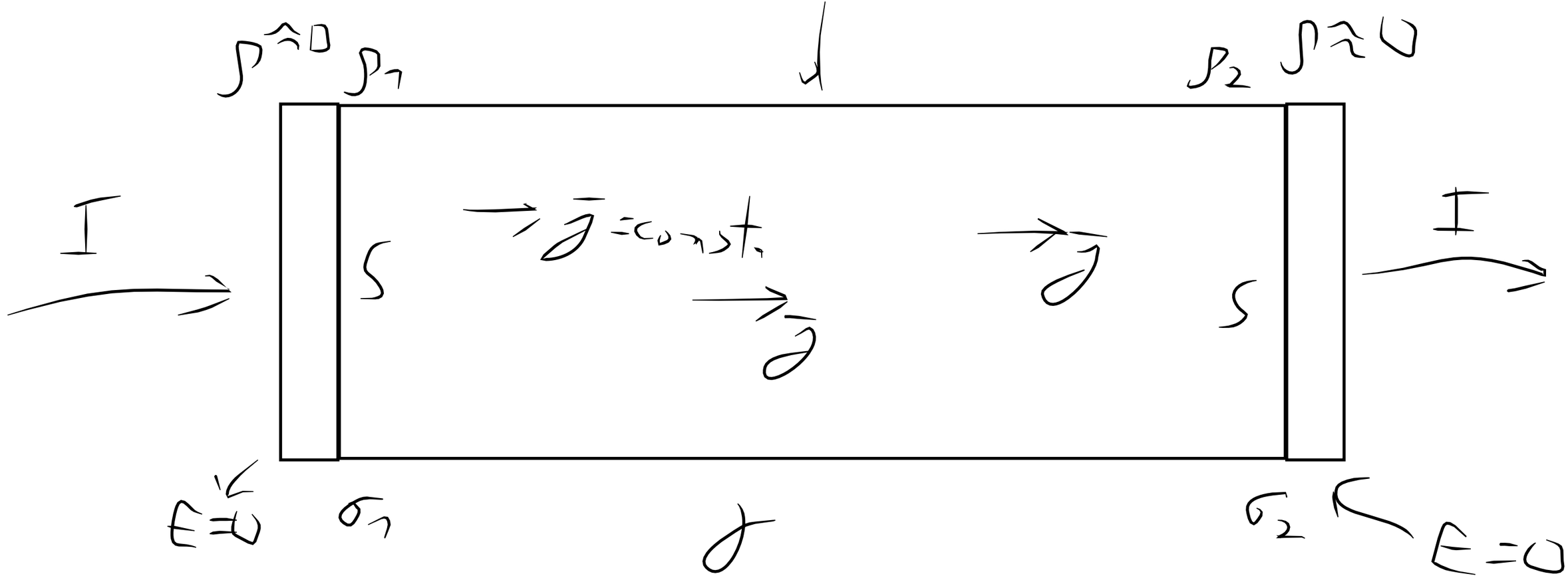
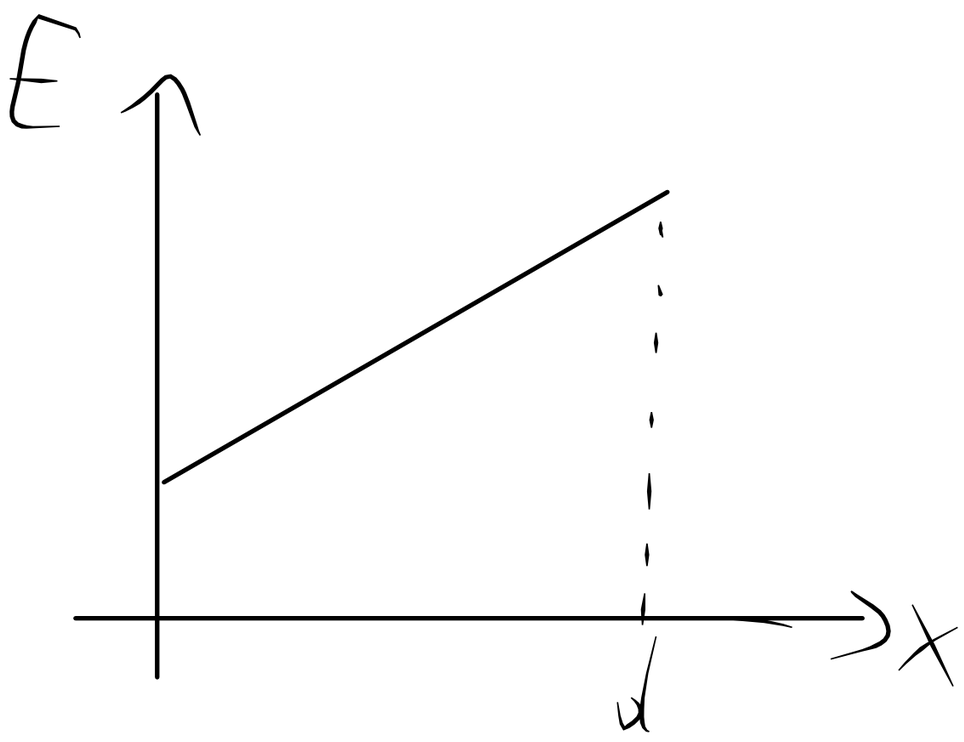


$$\vec{E} = \rho \vec{J} \qquad \rho(x) = \frac{\rho_2 - \rho_1}{d} x + \rho_1$$



$$\vec{E} = \vec{J}\left(\frac{\rho_2 - \rho_1}{d} x - \rho_1\right)$$

$$\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\varepsilon_0}$$

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

$$\nabla\left(J \frac{\rho_2 - \rho_1}{d} x - \rho_1\right) = \frac{\rho}{\varepsilon_0}$$

$$J \frac{\rho_2 - \rho_1}{d} = \frac{\rho}{\varepsilon_0} \qquad \rho = J \frac{\rho_2 - \rho_1}{d} \varepsilon_0$$

$$E(0^+) - E(0^-) = J \rho_1 = \frac{\sigma_1}{\varepsilon_0} \qquad \sigma_1 = J \rho_1 \varepsilon_0$$

$$E(d^+) - E(d^-) = -J \rho_2 = \frac{\sigma_2}{\varepsilon_0} \qquad \sigma_2 = -J \rho_2 \varepsilon_0$$

$$Q_{cont} = S \sigma_1 + S d J + \sigma_2 S = S J \varepsilon_0 (\rho_1 - \rho_2 + \rho_2 - \rho_1) = 0$$