$$\frac{\sigma}{\varepsilon_0}$$

(graph with E axis vs x, line from origin to d)

polo poluvodič   metal

$$\rho_n = e\,n$$

$$|Q_m| = |Q_{pp}|$$

V

$$\rho_n$$

(graph ρ vs x, step at d)

$$x$$

$$\operatorname{div} \vec{E} = \frac{\rho}{\varepsilon_0} \qquad\qquad |\sigma| = |\rho_n d|$$

$$E = E_x \qquad \frac{dE}{dx} = \frac{\rho_n}{\varepsilon_0} \qquad E = \frac{\rho_n}{\varepsilon_0}\, x$$

$$U = -\int_0^d E\,dx = -\frac{\rho_n}{\varepsilon_0}\int_0^d x\,dx = \frac{-\rho_n d^2}{2\varepsilon_0}$$

$$Q = \rho_n S d = -2\,\frac{\varepsilon_0\, U S}{d}$$

$$C = \frac{Q}{U} = -2\,\frac{S\varepsilon_0}{d}$$

$$C_r = \frac{dQ}{dU} = -2\,\frac{\varepsilon_0 S}{d}$$