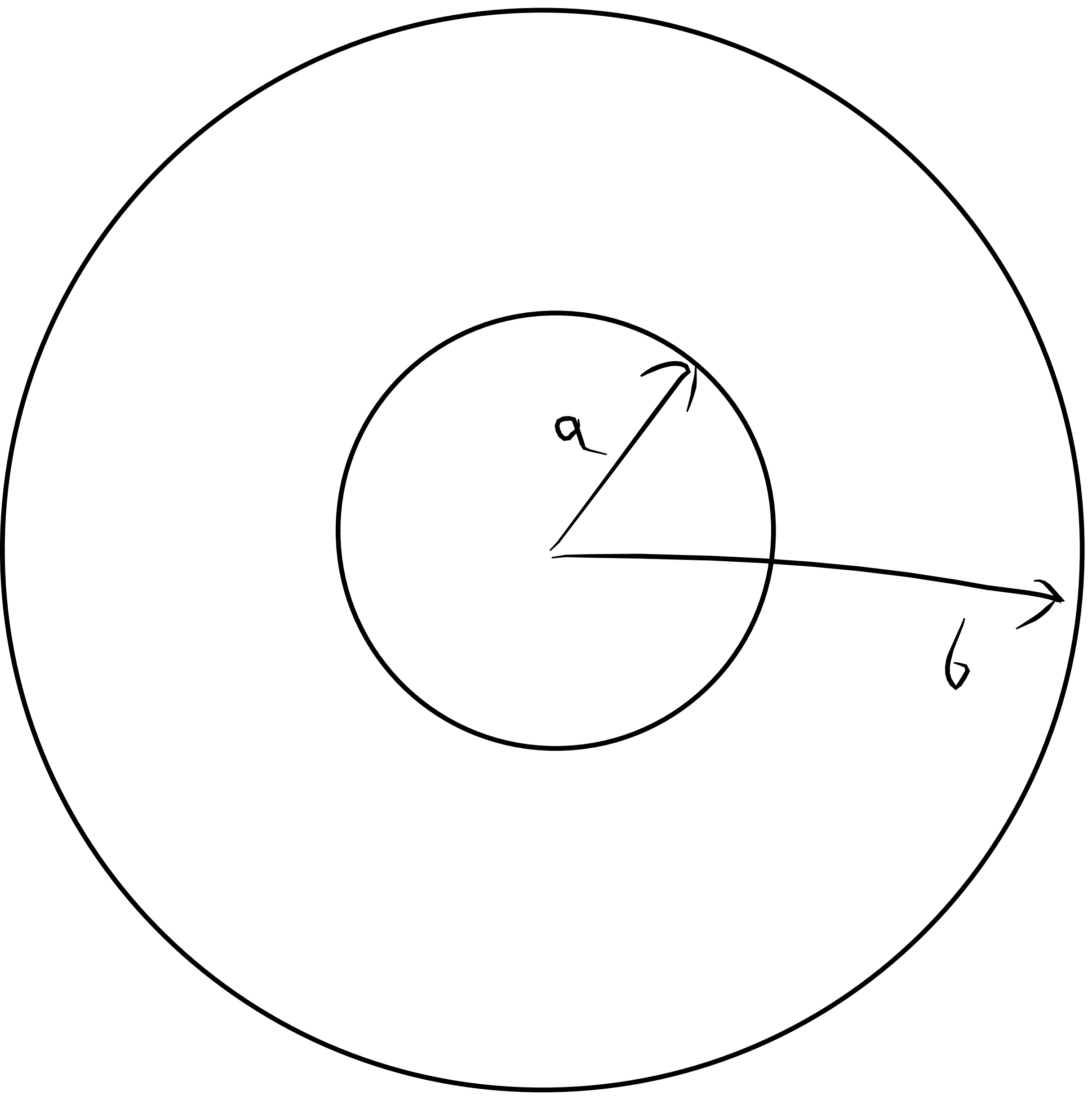
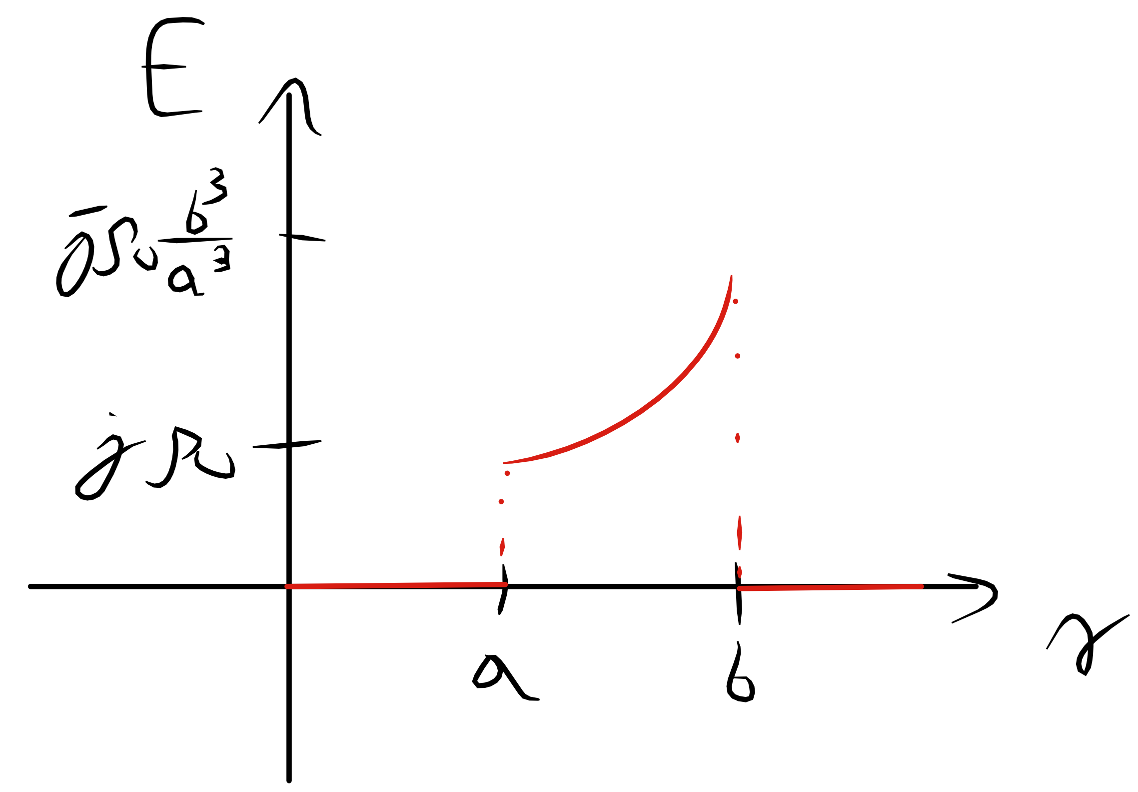


$$\rho(r) = \rho_0 \frac{r^3}{a^3}$$

$$R = \int_a^b \rho(r) \frac{dr}{4\pi r^2} =$$

$$= \frac{\rho_0}{4\pi a^3} \int_a^b r\, dr = \frac{\rho_0}{8\pi a^3}\left(b^2 - a^2\right)$$

$$\bar{\nabla} \bar{E} = \frac{\sigma}{\varepsilon_0}$$



$$\frac{dE}{dr} = \frac{\sigma}{\varepsilon_0}$$

$$E = \frac{\sigma}{\varepsilon_0} r$$

$$\bar{E} = \bar{j}\rho = \bar{j}\rho_0 \frac{r^3}{a^3} \qquad j = \text{const.}$$

$$\sigma(r) = \frac{E\,\varepsilon_0}{r}$$

$$U = -\int_a^b E\, dr = \frac{-j\rho_0}{a^3} \int_a^b r^3 dr = \frac{-j\rho_0}{4a^3}\left(b^4 - a^4\right)$$

$$\sigma(r) = \frac{-4\varepsilon_0 r^2}{b^4 - a^4}$$

$$j = \frac{-4Ua^3}{\rho_0}\left(\frac{1}{b^4 - a^4}\right)$$

$$\frac{\sigma_1}{\varepsilon_0} = E\left(a^+\right) - E\left(a^-\right)$$

$$\bar{E} = \frac{-4Ur^3}{b^4 - a^4}$$

$$\frac{\sigma_1}{\varepsilon_0} = \frac{-4Ua^3}{b^4 - a^4}$$

$$Q_1 = \sigma_1 \varepsilon_0 4\pi a^2 = \frac{-16\pi a^5 \varepsilon_0}{b^4 - a^4}$$

$$\frac{\sigma_2}{\varepsilon_0} = \frac{4Ub^3}{b^4 - a^4}$$

$$Q_2 = \frac{16\pi b^5 \varepsilon_0}{b^4 - a^4}$$

$$Q_{1-2} = \int_a^b \sigma(r) \cdot 4\pi r^2 dr = \frac{-16\pi\varepsilon_0}{b^4 - a^4} \int_a^b r^4 dr = \frac{-16\pi\varepsilon_0}{b^4 - a^4} \cdot \frac{1}{5}\left(b^5 - a^5\right)$$