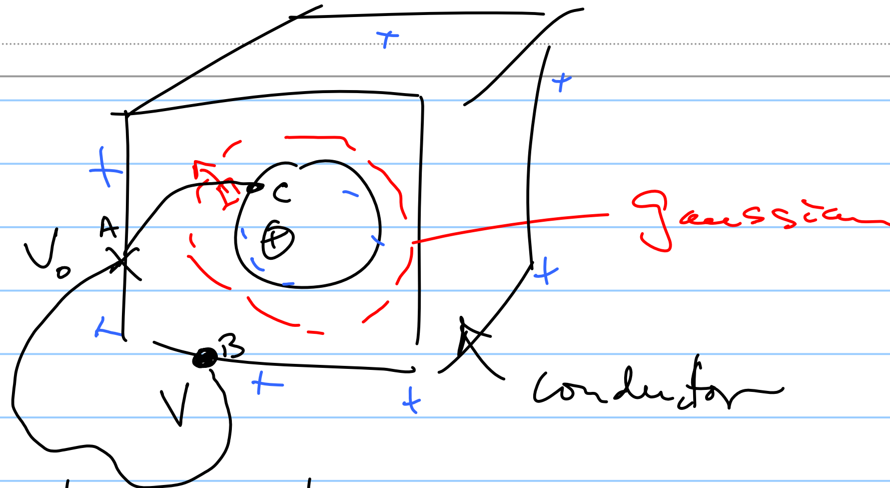
Note Title 1/26/2007



$$\oint \vec{E} \cdot d\vec{a} = 0 = \frac{Q_{encl}}{\epsilon_0}$$
($\vec{E}$ " 0)

What is the voltage in conductor.

$$\Delta V = -\int_A^B \vec{E} \cdot d\vec{r} = 0 \qquad (\vec{E} \text{ " } 0)$$

$$V_B - V_A = 0 \qquad V_B = V_A$$

$$V_B - V_C = 0$$

Before **Summation Problem:** given ρ → (V), (E)

$$E = \int \frac{k\rho\, d\tau'}{r^2} \hat{r}$$

Boundary Value Problem:

$\nabla^2 V = -\frac{\rho}{\epsilon_0}$ (ρ) → (V)   ($\vec{E}$)

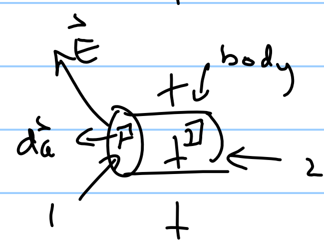
Partial Differential Eqn &
boundary condition

IN Vacuum PDE $\longrightarrow$ $\nabla^2 V = 0$

with bndry condition (V is const on bndry)

↑ region when there is no charge

In class problem



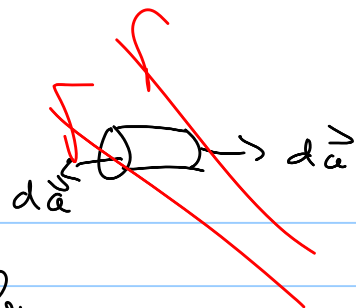
$$\oint \vec{E} \cdot d\vec{a} = \int \vec{E}_1 \cdot d\vec{a} + \int \vec{E}_2 \cdot da + \int \vec{E}_b \cdot d\vec{a}$$

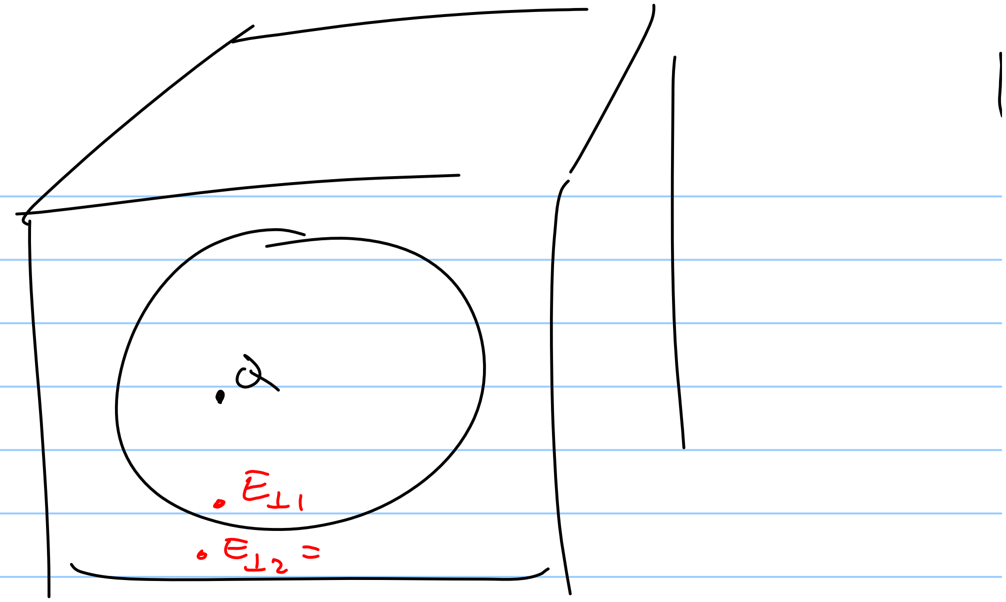
① ② body → Crush the can

$$E_{\perp 1} A - E_{\perp 2} A = \frac{\sigma A}{\epsilon_0}$$

area end cap is very small but not zero so E is constant over surfa

$\sigma(x,y) \simeq$ constant in this region





Bndry value problem

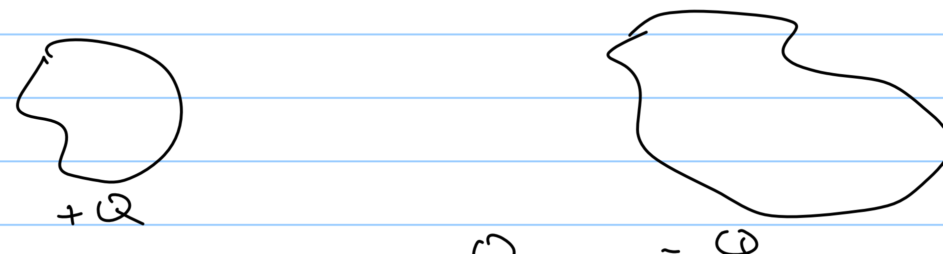
find $V(x,y,z)$ in region where there is not charge

Then know $\vec{E} = -\vec{\nabla} V(x,y,z)$

$$E_{\perp 1} - E_{\perp 2} = \frac{\sigma(x,y,z)}{\epsilon_0} \quad \text{on bndry}$$

($E_{\perp 2} = 0$)

Capacitors:



$\Delta V \propto Q$ $\quad$ $\Delta V = \frac{1}{C} Q$ $\quad$ $C = \frac{Q}{\Delta V}$