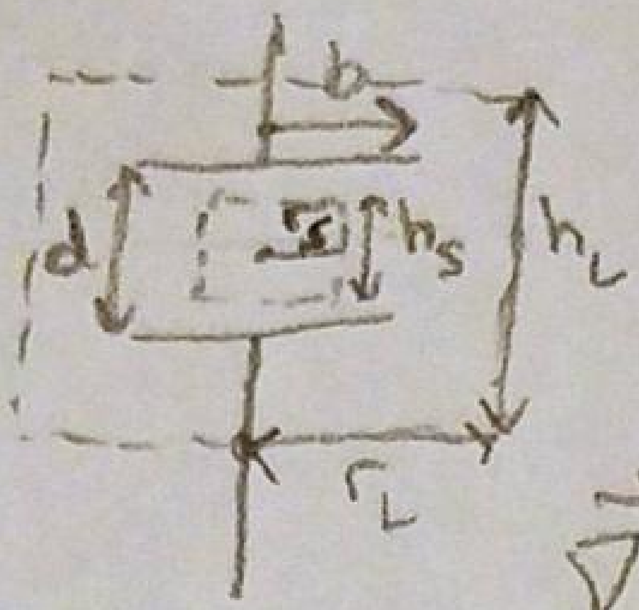
For the "small cylinder:"

5.2 $$\int_V \left[\frac{\partial}{\partial t}\left(\frac{\vec{B}\cdot\vec{H}}{2}\right)+\frac{\partial}{\partial t}\left(\frac{\vec{D}\cdot\vec{E}}{2}\right)+\vec{E}\cdot\vec{J}\right]\partial V = -\oint_S (\vec{E}\times\vec{H})\cdot\partial\vec{S}$$



$$E = \frac{Q}{\varepsilon_0 S} \qquad V = \frac{Qd}{\varepsilon_0 S} \rightarrow \frac{Q}{\varepsilon_0 S} = \frac{V}{d}$$

$$\hookrightarrow E = \frac{V}{d} \qquad d = h_s, \text{ so } E = \frac{V}{h_s}$$

$$\vec{\nabla}\times\vec{H} = \varepsilon_0 \frac{\partial \vec{E}}{\partial t} = \frac{\varepsilon_0}{h_s}\frac{\partial V}{\partial t}$$

$$\oint_S \vec{H}\cdot\partial\vec{\ell} = \vec{H}\cdot 2\pi r_s = \frac{\varepsilon_0}{h_s}\pi r_s^2 \frac{\partial V}{\partial t} \rightarrow H = \frac{\varepsilon_0 r_s}{2h_s}\frac{\partial V}{\partial t}$$

$$\vec{E}\times\vec{H} = -\frac{\varepsilon_0 r_s}{2h_s^2} V \frac{\partial V}{\partial t}$$

$$-\oint_S (\vec{E}\times\vec{H})\,\partial\vec{S} = 2\pi r h_s\left(\frac{\varepsilon_0 r_s}{2h_s^2} V\frac{\partial V}{\partial t}\right) = \frac{\partial}{\partial t}\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{h_s}\right]$$

$$\int_V \left[\partial/\partial t\left(\frac{\vec{B}\cdot\vec{H}}{2}\right)\right]\partial V = \int_V\left[\partial/\partial t\left(\frac{\mu_0 \vec{H}\cdot\vec{H}}{2}\right)\right]\partial V = \frac{\partial}{\partial t}\left[\frac{\mu_0}{2}\left[\frac{\varepsilon_0}{2h_s}\frac{\partial V}{\partial t}\right]^2 h_s \int_0^{r_s} r^2\, 2\pi r\, dr\right]$$

$$= \frac{\partial}{\partial t}\left[\frac{\mu_0 \varepsilon_0 r_s^2}{16}\left(\frac{\pi r_s^2 \varepsilon_0}{h_s}\right)\left(\frac{\partial V}{\partial t}\right)^2\right]$$

$$\int_V \left[\partial/\partial t\left(\frac{\vec{D}\cdot\vec{E}}{2}\right)\right]\partial V = \int_V \left[\partial/\partial t\left[\frac{\varepsilon_0 \vec{E}\cdot\vec{E}}{2}\right]\right]\partial V$$

$$= \frac{\partial}{\partial t}\left[\frac{1}{2}\varepsilon_0 (h_s \pi r_s^2)\left(\frac{V}{h_s}\right)^2\right] = \frac{\partial}{\partial t}\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{2h_s}\right]$$

$\int_V \vec{E}\cdot\vec{J}\,\partial V = 0$ because no current is flowing into the "small cylinder"

So we have:

$$\partial/\partial t\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{h_s}\right] = \frac{\partial}{\partial t}\left[\frac{\mu_0 \varepsilon_0 r_s^2}{8}\left(\frac{\pi r_s^2 \varepsilon_0}{2h_s}\right)\left(\frac{\partial V}{\partial t}\right)^2\right] + \partial/\partial t\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{2h_s}\right] + 0$$

when $\frac{\mu_0 \varepsilon_0 r_s^2}{8}(\partial/\partial t)^2 \ll V^2$, the equation becomes:

$$\partial/\partial t\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{h_s}\right] = \partial/\partial t\left(\frac{1}{2}\right)\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{h_s}\right] + \partial/\partial t\left(\frac{1}{2}\right)\left[\frac{\pi r_s^2 \varepsilon_0 V^2}{h_s}\right]$$

Assuming no charges on the plate at $t=0$ and that $E = \frac{Q}{\varepsilon_0 S}$

General idea is correct, but seems like a page is missing.

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For the "large cylinder," the $\vec{E}$ field is 0 outside of the capacitor, $-\oint_S (\vec{E} \times \vec{H}) \cdot d\vec{s} = 0$

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