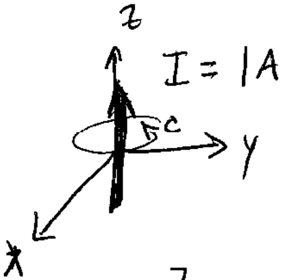
Gauss Law for $\bar{H}$

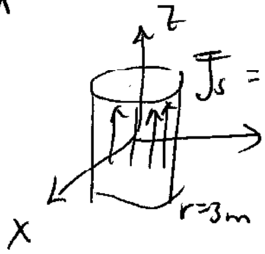
$$I = \oint_c \bar{H}\cdot d\bar{\ell}$$



$$I = 1A\,\hat{z}$$

$$1A = \int_{\phi=0}^{2\pi} H_\phi\,\hat{\phi}\cdot r\,d\phi\,\hat{\phi} = H_\phi\,2\pi r$$

$$\bar{H} = \frac{1}{2\pi r}\,\hat{\phi}$$



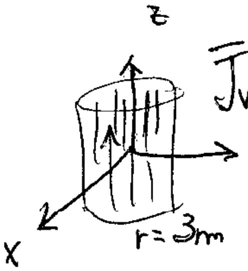
$$\bar{J}_s = 1\frac{A}{m^2}\,\hat{z}$$

$I = 0$ inside $r < 3m$

$$= \int_{\phi=0}^{2\pi} \left(1\frac{A}{m^2}\right) \overset{3m}{r}\,d\phi = (3)(2\pi) \text{ for } r \geq 3m$$

$$\oint_c \bar{H}\cdot d\bar{\ell} = H_\phi\,2\pi r \text{ from above}$$

$$\bar{H} = \frac{6\pi}{2\pi r}\hat{\phi}\quad r \geq 3m\ ;= 0 \text{ for } r < 3m$$



$$\bar{J}_v = 1\frac{A}{m^3}\,\hat{z}$$

$$I = \int_{\phi=0}^{2\pi}\int_{r=0}^{r} 1\frac{A}{m^3}\,r\,dr\,d\phi = 2\pi\frac{r^2}{2}\quad r \leq 3m$$

$$= \int_{\phi=0}^{2\pi}\int_{r=0}^{3m} \frac{1A}{m^3}\,r\,dr\,d\phi = 2\pi\,\frac{3^2}{2}\quad r \geq 3m$$

$$\oint_c \bar{H}\cdot d\bar{\ell} = 2\pi r\,H_\phi \text{ from above}$$

$$\bar{H} = \frac{\pi r^2}{2\pi r}\,\hat{\phi}\quad r < 3m$$

$$= \frac{\pi 9}{2\pi r}\,\hat{\phi}\quad r \geq 3m$$