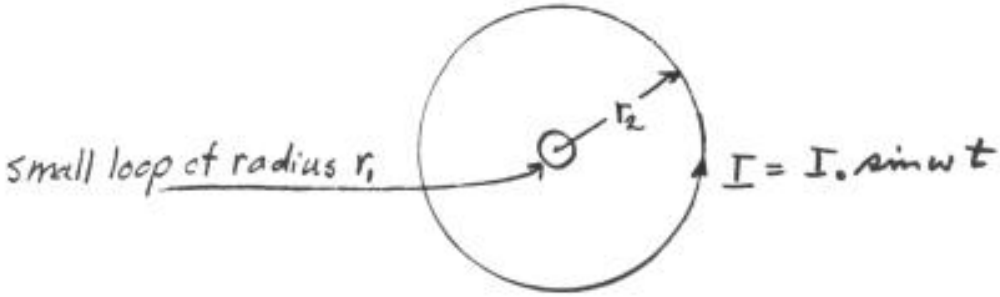
(15) 4. A small circular loop of wire of radius r_1 and resistance R is centered inside a large circular loop of radius r_2. The large loop carries a current $I = I_0 \sin \omega t$. Find a formula for the peak current in the small loop.



$$\Phi_{\text{small loop}} = \pi r_1^2 B_c \qquad B_c = \frac{\mu_0 I_0 \sin \omega t}{2 r_2}$$

$$\Phi = \pi r_1^2 \frac{\mu_0 I_0 \sin \omega t}{2 r_2}$$

$$\mathcal{E} = -\frac{d\Phi}{dt} = -\frac{\pi r_1^2 \mu_0 I \omega \cos \omega t}{2 r_2}$$

$$\mathcal{E} = I R$$

$$\boxed{I_{peak} = \frac{\pi r_1^2 \mu_0 I \omega}{2 r_2 R}}$$