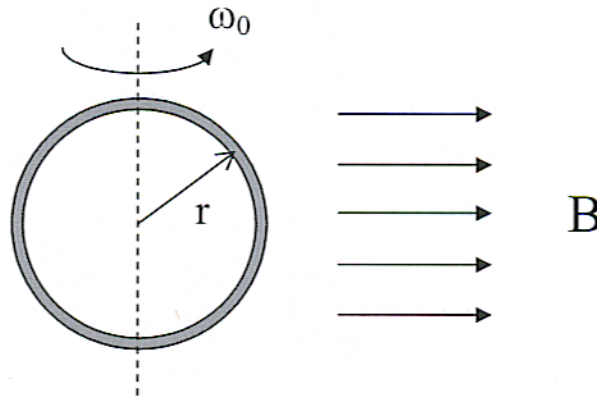


A thin metallic ring of mass m , electrical resistance R , and radius r is driven at a fixed angular frequency ω_0 about an axis perpendicular to a uniform magnetic field \mathbf{B} , as shown in the figure. At $t=0$, the plane of the ring is along the field direction as shown in the figure.



Please state your system of units (SI or CGS). You may assume that magnetic fields generated by currents in the ring can be neglected.

- Find the current in the ring as a function of time.
- Find the average energy loss per cycle due to Joule heating.

Now, we stop driving the coil, allowing it to rotate freely.

- Find the decay time of the ring's rotation (the time it takes for the angular frequency to slow to $1/e$ of its initial value). You may assume that the fractional change in the ring's rotation frequency per cycle is small.