

EM Fall 98A

A thin metallic ring of mass m , electrical resistance R , and radius a is rotating about an axis perpendicular to a uniform magnetic field \mathbf{B} as shown in the figure. Initially the ring rotates with a frequency ω_0 . Throughout this problem, you may assume that the fractional change in the ring's rotation frequency per cycle is small. Please state your system of units (SI or CGS).

- A) Determine the average energy loss per cycle due to Joule heating.
- B) Determine the time it takes for the frequency of the rotation to slow down to $1/e$ of its initial value. Express your answer in terms of the parameters above.

