

HOMework 4

Due: Tuesday , February 28

Problems: Energy and Momentum of the EM field;

Poynting's Vector (Chapter 8, Griffiths)

8.1, 8.2, and 8.6

Problem 4

Uniformly charged spherical shell with charge q and radius R is set spinning at an angular velocity $\boldsymbol{\omega} = \omega_0 \mathbf{e}_z$. Calculate:

- (a) The total energy contained in the electromagnetic field inside the spherical shell.
- (b) The Poynting vector in an arbitrary point of space \mathbf{r} .

Hint: Magnetic field can be calculated using the vector-potential \mathbf{A} (Griffiths, Example 5.11)