Homework (2) 4
Due February 19th 2007.

1. The charged particle is moving with velocity \( v \lesssim c \) in optically active media with dielectric constant \( \epsilon(\omega) > 1 \) and \( \mu = 1 \).
   a. Compute electric and magnetic fields at large distances from the particle.
   b. Use the results of (a) to compute the energy flux carried away by the electromagnetic wave. Compare with the computation of the force acting on the particle.
   c. What is the total emitted energy for the simplest dispersive media

\[
\epsilon(\omega) = 1 + \frac{\omega_0^2}{\omega_0^2 - \omega^2}
\]

2. Find the energy emitted by electric dipole moving with velocity \( v \lesssim c \) in optically active media with dielectric constant \( \epsilon(\omega) > 1 \) and \( \mu = 1 \). Assume that the direction of the motion is parallel to the dipole moment.

3. Same for the neutral particle with magnetic moment parallel to the direction of its motion.