

Electrodynamics
Spring, '05
Problem Set 5

Due: In class, May 27, 2005

Problem 1: Jackson 9.1

Problem 2: Jackson 9.2

Problem 3: Jackson 9.8

Problem 4: A small loop with radius R ($kR \ll 1$) has a current that oscillates with a frequency ω and amplitude I . Find the linear moment magnetic dipole radiation radiated from this source. In the radiation, what is the magnitude and angular distribution of the power radiated? Find (numerically, if you have to) the spherical multipole moments of this system and make a table similar to Jackson's 9.2 and plots similar to Fig. 9.7.

Problem 5: Two dipole antennae of length d are situated a distance D apart. What should the orientation of the antennae be such that you maximize power in the north-south and east-west directions. What should the phase and the distance between the two antennae be to maximize the quadrupole radiation?