# PHYS 301
HOMEWORK #11 (Optional)
Due : 27 April 2012

If you wish to have this homework set count toward your grade, please turn it in (in one electronic file or one hardcopy version) at the beginning of the last day of class, 27 April. You can pick it up from me during exam week. If you do submit for a grade, it will factor into your HW grade as would any other homework; if you do not submit it (or turn it in to be corrected but not graded) it will not affect your grade in any way. If you wish to have your homework corrected but not graded, indicate this on the first page of the assignment, otherwise I will count it toward your grade. Question 1 is worth 20 points; all other questions are worth ten points. You may but need not submit computer plots as suggested in Boas.

1. The diagram below shows a linear electric octupole:
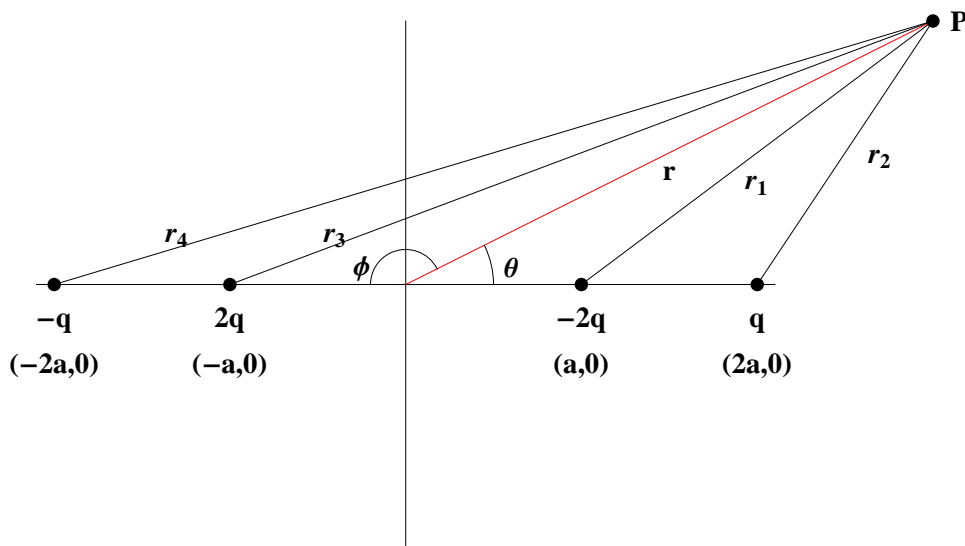
Find the potential at point P using Legendre polynomials. Combine sums as appropriate to show that the first non - zero term involves the third order Legendre polynomial. Write out the first three non zero terms of the potential. Find the components of the electric field.

2. Show that $u = f(x - vt)$ and $u = f(x + vt)$ satisfy the wave equation.

3. Boas, problem 1 page 626.

4. Boas, problem 2, page 626.

5. Boas, problem 7, page 626.

6. Boas, problem 2, page 632.

7. Boas, problem 5, page 632.

8. Boas, problem 1, page 650. (Assume azimuthal symmetry)

9. Boas, problem 8, page 650. (Assume azimuthal symmetry)