PHYC 511: Electrodynamics

Spring 2018

Homework Assignment #5

(Due April 2, 2018)

1- Show that a spherically symmetric, breathing (i.e., purely radially oscillating) distribution of charge constitutes a time-dependent current that does not radiate. Construct another time-dependent current distribution that too does not radiate. (Hint: Is the current density transverse or longitudinal?)

2- Derive the outgoing-wave and incoming-wave Greens functions for the Helmholtz equation in one unbounded spatial dimension z. I.E., solve the equation

$$\left(\frac{\partial^2}{\partial z^2} + k^2\right) G(z) = \delta(z),$$

and find both of the outgoing-wave and incoming-wave solutions.

3- Problem 6.8, Jackson.

4- Problem 6.11, Jackson.

5- Problem 7.27, part (b), Jackson.