

ECEn 560
Electromagnetic Wave Theory

Homework #16

Due March 10, 2016 (may be turned in late for half credit)

1. Consider two Hertzian dipoles located at \bar{r}_a and \bar{r}_b and with orientations \hat{p}_a and \hat{p}_b . The first radiates the field \bar{E}_a and the second radiates \bar{E}_b . (a) Apply the reciprocity theorem and evaluate the reaction integrals using the delta function form of the currents. (b) Give a physical interpretation in words for the equality resulting from the reaction theorem for the two sources.
2. (a) Find the electric field radiated by a surface current $\bar{J}_s = 3\hat{\phi}$ impressed at the surface of a PEC cylinder of unit radius lying on the z axis. (b) Is there an induced current on the PEC cylinder? If so, how does it relate to the impressed current?