

## ECE 222b: Homework #4

### Problem 1

An incident plane wave with the electric field  $\mathbf{E} = \hat{\mathbf{z}}e^{-jkx}$  excites an impedance cylinder of radius  $a$  and surface impedance  $Z_s$ . Derive Mie series expressions for the scattered electric and magnetic fields.

### Problem 2

Give Mie series expressions for the surface current on a PEC cylinder of radius  $a$  excited by a plane wave propagating in the  $x$  direction for the case of a TE<sub>z</sub> polarization and TM<sub>z</sub> polarization. Plot the surface current vs. angle for  $a = \lambda/2, 2\lambda, 10\lambda$ .