# Scattering from spherical geometries

Near and far field calculation of fields scattered by spherical geometries. The radar cross section in dB square metres is calculated as well as the E field offset from the sphere centre by a small distance in the observation direction.

The classes of geometry which may be handled are:

PEC sphere with dielectric coating

PEC sphere with dielectric coating and impedance boundary outer coating

Dielectric sphere with impedance boundary coating

NOTE: this program uses old material and thin layer formats. Needs updating...

## Geometry description:

sphere centered on the origin with illuminating plane wave from a specified direction.

r

z

Hy

y

Ex

x

Run with the command:

**mie**

inputs:

the code requires the name of a file which specifies the problem to be solved.

The problem specification file has the following form where all lines starting in # are comment lines:

# radius of PEC sphere: set to zero for no PEC sphere

**0.5**

# radius of coating

**1.0**

# material filename: file name of coating material

**FDMAT.fdmat**

# thin\_layer constant. set to 0 for no sheet, 1 to include sheet

**0**

# thin layer filename: must include a file name here even if there is no impedance sheet

**free.rdefine**

# frequency range: fmin fmax number of frequencies

**2.998e8 2.998e8 1**

# theta range: theta\_min theta\_max number of theta angles

**0.0 180.0 181**

# phi range: phi\_min phi\_max number of phi angles

**180.0 180.0 1**

# number of terms in series solution

**20**

# output filename for rcs data and E field offset from the sphere centre by a small distance **s\_2l\_FDmat\_ref\_e.rcs**

output:

the output file has the format:

frequency theta phi RCS {dBsm} real{Etheta} imag{Etheta} real{Ephi} imag{Ephi}

the material characteristics are also output to files:

**epsr.fout**

**mur.fout**

and the thin layer characteristics are output to

**z11.fout**

**z12.fout**

**z21.fout**

**z22.fout**