Electromagnetic Scattering from an Arbitrarily Shaped Three-Dimensional Inhomogeneous Chiral Body

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This work is a result of an extensive research related to electromagnetic scattering by various three-dimensional inhomogeneous bodies, with the concentration on inhomogeneous chiral scatterers. In order to achieve quantities that describe electromagnetic behavior in the close proximity as well as far from an electromagnetic scatterer illuminated by a plane electromagnetic wave, the method of moments (MoM) has been used.

The volume equivalence principle has been applied to obtain two coupled integral equations for equivalent electric and magnetic volume currents. These integral equations were solved using the method of moments (MoM) with tetrahedral meshing and SWG basis functions. We also used an approximate Galerkin's method for testing.

Results obtained for homogeneous and inhomogeneous dielectric and magnetic scatterers are in an excellent agreement with previously published data. Figures below show bistatic radar cross sections for two inhomogeneous chiral bodies—an inhomogeneous two-layered chiral sphere and an inhomogeneous chiral cube. The numerical results for the inhomogeneous chiral sphere show a good agreement with the exact data obtained using the eigenfunction series method.