

Preface

The advancement in metamaterial science and technology has led to some of the interesting applications over the entire frequency spectrum. One among these exciting applications is the invisibility cloak. The concept of invisibility has attracted researchers in the aerospace discipline to implement it for low observability. The Maxwell's equations in conjunction with transformation optics in anisotropic media is the fundamental principle of operation of invisibility cloak. A major challenging issue in the design of invisibility cloak lies in the determination of permittivity and permeability tensors for each cloaking shell.

This brief systematically describes analytical expressions for the permittivity and permeability tensors for various quadric surfaces that find application in aerospace platforms. The spatial metric derivations for permittivity tensors of circular, elliptic, hyperbolic and parabolic cylinders, sphere, right circular cone, prolate spheroid, oblate spheroid, general paraboloid of revolution, and ogive have been included in this brief. Various cloaking shells of arbitrary shapes can be designed with the help of this mathematical formulation of diverse quadratics and their hybrids.

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Applications

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