Abstracts

An Algorithm for the Treatment of Curved Metallic Laminas in the Finite Difference Time Domain Method

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The Finite Difference Time Domain (FDTD) method, implemented in Cartesian coordinates, is well proven as an efficient technique for the electromagnetic analysis of a wide variety of microwave structures. The standard FDTD method is, however, less efficient if the structure under investigation has boundaries which are not parallel to the coordinate axes. Techniques designed to overcome this problem such as locally or globally deformed grids, or the use of nonorthogonal coordinate systems have been reported but these impose a penalty in computational effort or in flexibility. In this contribution, an alternative technique is described whereby the standard Cartesian grid is maintained, and the existence of the material boundaries is accounted for by the use of special finite difference equations for the affected nodes. These equations take account not only of the position of the boundaries but also of the asymptotic field behavior in their vicinity. This technique results in a flexible, accurate, and efficient, implementation which is applicable to a wide range of MMIC and antenna structures.

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