Abstracts

Analysis of hollow conducting waveguides using superquadric functions-A unified representation

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Waveguides of various geometries have found many applications. The analysis of the wave modes inside these waveguides are usually subject to cross sections of the waveguides and specific, but convenient, coordinate systems have to be chosen in the analysis. In this paper, the boundary geometries of waveguides (which include rectangular, circular, elliptical, triangular, coaxial, etc.) are represented in a unified manner by a superquadric function. In this paper, with the Rayleigh-Ritz method, the wave propagation characteristics in a hollow conducting waveguide of the superquadric cross section are analyzed in a unified manner. From the analysis, it is realized that the superquadric function can be utilized to accurately model the boundary of various waveguide structures through variation of the shape parameters. The comparisons between the analytical and computational results show this method is accurate and efficient.

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