Abstracts

A New Scalar Transition Finite Element for Accurate Analysis of Waveguides with Field Singularities

J.M. Gil and J. Zapata. "A New Scalar Transition Finite Element for Accurate Analysis of Waveguides with Field Singularities." 1995 Transactions on Microwave Theory and Techniques 43.8 (Aug. 1995 [T-MTT]): 1978-1982.

When the scalar Helmholtz equation is solved by Finite Element Method, a slow rate of convergence and inaccurate results can be found if waveguides containing field singularities are analyzed. By using singular elements around the singularity, an important improvement is attained, but when the size of the singular elements is too small, the correct modeling of the fields is lost. In this paper we introduce a new family of transition finite elements that represents a behavior of the axial field component of the form O (r/sup lambda/), with any 0 < lambda < 1, for singular points placed outside the element. By employing these transition elements adjacent to singular elements, the loss of the singular modeling of the fields is avoided.

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