Abstracts

Efficient CAD of discontinuities between elliptical and circular waveguides

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Elliptical waveguides are currently finding several applications, since they provide Improved flexibility with respect to circular waveguides and better manufacturability and higher Q with respect to rectangular waveguides. Effective CAD of components involving elliptical waveguides requires the efficient evaluation of the scattering parameters at the discontinuity occurring between elliptical and circular or rectangular waveguides. In this study we present analytical formulas for the efficient CAD of a junction between a circular and an elliptical waveguide of larger cross-section. With respect to current approaches, based on the numerical evaluation of the coupling integrals, the analytical formulas permit a significant reduction of computer time of more than one order of magnitude. We have implemented the above formulas and results have been tested against published data and compared with those obtained by numerical integration: in all cases an almost perfect agreement is observed.

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