Abstracts

Generalized Scattering Matrix of Waveguide Corners Distorted by Discontinuities in the Resonator Region

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A new generalized scattering matrix formulation is presented for the calculation of waveguide corners distoned by discontinuities. The novel approach lies in the fact that the introduction of shorting planes some distance away from the actual discontinuity as is common practise in analyses known so far is entirely avoided. Therefore, this method allows the computation of components in which other structures are connected as closely as possible to the waveguide corner. This follows directly from the rigorous incorporation of higher-order mode interactions. Previously, only fundamental-mode scattering parameters could be calculated and, therefore, connected components had to be far enough away from the waveguide corner in order to avoid interference of reactive fields. Consequently, the theory presented in this paper will, first, allow the calculation and design of more complex waveguide components and, secondly, contribute to a more efficient use of component space. At the examples of 90 and 180 degree waveguide bends, the theoretical model is compared with measurements and a finite-element analysis. Results are found to be in good agreement.

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