Abstracts

Rigorous Mode-Matching Method for the Modal Analysis of the T-Junction Circular to Sidecoupled Rectangular Waveguide

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A rigorous field theoretical method is presented for the accurate modal analysis of the T-junction circular to sidecoupled rectangular waveguide which includes the so-called meniscus effect of the curved structure at the interface of the two different waveguide sections. The method is based on the mode-matching technique for the circular and rectangular waveguide portions of the structure in combination with the boundary-contour mode-matching (BCMM) principle for the intermediate waveguide section. In contrast to available approximate approaches, this method is rigorously valid also for large apertures, or for more than one aperture in the same plane, which are often required in typical filter, OMT or hybrid-T applications. The efficiency of the method is demonstrated by calculating a single T-junction with a large aperture and a double-aperture coupled T-junction. The theory is verified by excellent agreement with measurements.

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