Abstracts

A comprehensive study of discontinuities in chirowaveguides

We provide a comprehensive study of two- and three-dimensional discontinuities in chirowaveguides. The multimode coupled-mode method is an effective numerical approach to analyze this problem. After obtaining the coupled-mode equations, we diagonalize the coupling matrix to obtain a multimode scattering matrix rather than the usual two-mode approximation. We calculate the scattering properties of coaxial waveguides partially filled with lossy chiral media. Excellent agreement is observed between our results and those obtained by the mode-matching method. We also compare our results in the achiral case for dielectric material partially filled rectangular waveguide with experimental data and results obtained by the mode-matching method. Excellent agreement is again found. Based on our analysis, numerical and analytical results are displayed to provide physical insight into the problem. First, we discuss the effects of the chirality admittance on scattering properties and find that the sensitivity of the scattering parameters to chirality admittance increases as the chirality admittance increases. Second, we find the dielectric constant has a great influence on the scattering parameters. Third, we find the relative influence of height and width of chiral obstacles in rectangular waveguides.

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