

Conformal-mapping design tools for coaxial couplers with complex cross section

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Numerical conformal mapping is exploited as a simple, accurate, and efficient tool for the analysis and design of coaxial waveguides and couplers of complex cross section. An implementation based on the Schwarz-Christoffel Toolbox, a public-domain MATLAB package, is applied to slotted coaxial cables and to symmetrical coaxial couplers, with circular or polygonal inner conductors and external shields. The effect of metallic diaphragms of arbitrary thickness, partially separating the inner conductors, is also easily taken into account. The proposed technique is validated against the results of the finite-element method, showing excellent agreement at a fraction of the computational cost, and is also extended to the case of nonsymmetrical couplers, providing the designer with important additional degrees of freedom.

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