Abstracts

Waveguide step discontinuities revisited by the generalized network formulation

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We consider the classical problem of waveguide step discontinuities from the perspective of the generalized network formulation. The latter has recently been introduced for systematically dealing, in an efficient and rigorous manner, with electromagnetic field representations and computations in complex structures. The approach is based on the topological partitioning of the complex structure into several subdomains joined together by interfaces. The suggested framework accommodates the use of different analytical/numerical methods (hybridization), the choice of alternative Green's functions and the selection of appropriate field quantities at the boundary between different regions. By using the generalized network formulation in the step discontinuity example, we note that it is possible to select alternative Green's functions with improved convergence properties with respect to those commonly used. In addition, a new canonical representation of the step discontinuity is derived and better insight is obtained on the relationship between integral equation formulations and mode-matching techniques for the analysis of step discontinuities.

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