Abstracts

Numerical Analysis of Waveguide Discontinuity Problems Using the Network Model Decomposition Method (Short Papers)

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This paper presents an application of the network model decomposition method to the analysis of arbitrarily shaped H- and E-plane waveguide junctions. By using the polygon discretization technique introduced in [1], the waveguide discontinuity region, which is surrounded by a metallic wall and the reference planes chosen, is first discretized; then the topological model and the corresponding network model for the waveguide discontinuity are established. In the formulation, equivalent current sources connected to the nodes on the boundary of the region have been introduced to replace the effect of the field external to the region. The field internal to the region is approximated by the nodal voltage distribution of the network model, which can then be used to determine the scattering parameters of the waveguide junction. A diakoptic algorithm for the solution of the network model has also been developed. To illustrate the applications and show the validity of the method, numerical results for various H- and E-plane junctions have been given and a favorable comparison has been made with other existing theories.

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