Abstracts

A New Hybrid Symmetrical Condensed Node for the Frequency-Domain TLM Method

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This paper presents an new hybrid symmetrical condensed node (SCN) for the frequency-domain TLM (FDTLM) method. The scattering matrix of the new node is developed by taking advantage of a new port numbering scheme introduced for the time-domain node and a shunt decomposition technique to determine the propagation constant and characteristic admittances on the node link lines. The characteristics of the new frequency-domain node are described by a symmetric symbolic scattering matrix. The symmetry of the matrix allows significant savings in computer memory. For lossless media the scattering matrix becomes Hermitian. A dispersion analysis shows that the new node exhibits a much smaller wave propagation error than other FDTLM nodes. To test the new node, eigenvalues and scattering parameters for microstrip lines and discontinuities are computed and compared with well established results from measurements and other numerical methods.

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