Abstracts

Projective Matrix Transformations in Microwave Network Theory

R.A. Speciale. "Projective Matrix Transformations in Microwave Network Theory." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 510-512.

Recent theoretical investigations reveal the dominant role played by a new type of matrix transformation in the theory of microwave networks composed of multiport elements; this is an extension to multidimensional vector spaces of the well-known scalar fractional bilinear transformations. Projective matrix transformations have been found to map the scattering matrix, the impedance matrix, and the admittance matrix of an n-port network embedded in a 2n-port supernetwork. The transfer-scattering matrix and the chain- or ABCD-matrix of a 2n-port network embedded in a 4n-port supernetwork, are also mapped in a similar manner by matrix transformations of the same type. A fundamental application of this new transformation is the generalization of the concept of image-parameters known for 2-port networks to that of image-matrices for 2n-port networks. This generalization leads to a rigorous normal-mode analysis of wave-propagation on image-matched chains of cascaded 2n-port networks.

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