Abstracts

Implementation of Conservation-of-Energy Condition in Small Aperture and Small Obstacle Theory (Short Papers)

C.-L. Ren. "Implementation of Conservation-of-Energy Condition in Small Aperture and Small Obstacle Theory (Short Papers)." 1972 Transactions on Microwave Theory and Techniques 20.7 (Jul. 1972 [T-MTT]): 488-490.

In a previous paper, Felsen and Kahn showed that the scattering matrix of small apertures and obstacles in multimode waveguide regions is conveniently calculated for general lossless structures, but observed that the scattering matrix does not satisfy the conservation-of-energy requirement. It is also to be noted that the scattering parameters could become much larger than unity or even infinite for frequencies near or at the cutoff of the coupled modes. A method is presented in this correspondence to implement the lossless condition so that the resultant scattering matrix satisfies the conservation-of-energy requirement and, consequently, can be represented as a lossless equivalent circuit for all frequencies. The corresponding impedance, admittance, and transfer matrices for general lossless symmetrical structures are given in compact form directly in terms of the scattering parameters.

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