Abstracts

Practical Strip-Line Microwave Circuit Design

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It is widely recognized that continuously tapered strip-line components afford certain important advantages over their discrete counterparts in practical applications. (The question of coupler directivity, for instance, must come under close scrutiny as requirements become more severe in terms of frequency and bandwidth.) It is the purpose of this paper to set forth principles by which such components may be realized as a consequence of design techniques tailored to consistency with a given set of operational requirements applicable at once to an aggregate of different microwave strip-line components. In general, some or all of the components in such a group will differ in their nominal response characteristics. Derived through judicious application of constraints in an optimization procedure, the method obviates the need for intracircuit transformers or connectors transmission line cross section geometry compromises, component overdesign, etc., while at the same time providing mutual component compatibility and preservation of the quality of quasi-TEM microwave signal processing for a given specified bandwidth. By way of example, compatible multioctave designs have been established for components having nominal, equal-ripple responses differing by 1.7 dB. Corresponding conventional designs would have required impedance ratios of as much as 3.68:1 for a dielectric spacing such that s/b=1/9. Of particular concern are couplers with symmetric and nonsymmetric local coupling coefficient distributions and dispersive all-pass phase shift network elements. The general nonsymmetric coupler is realized without abrupt discontinuities at either end and with a constant specified unbalance phase (0</spl Phi//sub u/ <90) over the passband. Typical examples of experimental results are given.

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