Abstracts

A Class of Broadband Three-Port TEM-Mode Hybrids

S.B. Cohn. "A Class of Broadband Three-Port TEM-Mode Hybrids." 1968 Transactions on Microwave Theory and Techniques 19.2 (Feb. 1968 [T-MTT]): 110-116.

The three-port hybrid considered in this paper is useful both as a power divider and power combiner. In the divider application, power entering the input port is split equally and with zero phase difference between the output ports. All ports are well matched and the output ports are highly isolated. The generalized form of the hyhrid circuit is a T junction followed by a multiplicity of cascaded pairs of TEM line lengths and interconnecting resistors. Due to symmetry, the resistors are decoupled from the input port, but they serve an essential function in providing output-port match and isolation. Each pair of lines and its associated resistor are referred to as a section. The one-section hybrid has been known and widely used. Its usable bandwidth is f/sub 2/ / f/sub 1/ =1.44:1 for VSWR <1.22 and isolation >20 dB. This paper shows that additional sections can provide a large increase in bandwidth. Some of the examples treated are as follows: two sections, f/sub 2/ / f/sub 1/ =2, VSWR <1.11, isolation> 27 dB; four sections, f/sub 2/ / f/sub 1/ =4, VSWR <1.10, isolation >26 dB; and seven sections, f/sub 2/ / f /sub 1/ =10, VSWR <1.21, isolation >19 dB. Exact design formulas are given for two-section hybrids, and approximate design formulas for three or more sections.

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