Abstracts

On the Analysis and Design of Three Coupled Microstrip Lines (Short Papers)

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The general configuration of a system of three coupled microstrip lines is analyzed and its parameters (mode numbers, effective dielectric constants, and modal impedances) are derived in terms of the system capacitances. These capacitances were computed by using the network analog method. In this paper, it is shown that for a system of three equal-width lines, there are, in general, the normal-mode impedances (four of which are independent). This would make the design of a system based on three equal-width lines, mainly with narrow strips and narrow separations, rather complicated. For a system of three equal-impedance lines, the number of mode impedances reduces to only three, which would facilitate the design. This latter system can be achieved by an appropriate increase of the width of the center line relative to that of the outer lines. Thus, a set of curves and a corresponding formula are obtained to determine this relative increase as a function of the geometric parameters. A complete set of design data for the new geometric configuration are also given. The experimental results of two fabricated three-line couplers, one based on the present data and the second on other published data, are compared.

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