Abstracts

Network analysis and synthesis of multislot back-to-back microstrip directional couplers

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This paper develops a method to analyze and synthesize multislot back-to-back microstrip directional couplers. The analysis is based on an equivalent four-port network of the coupler, where the slot is represented by a lumped reactance connected in series with the microstrip lines through ideal transformers. The reactance and turn-ratio values are computed by network analysis, taking into account the structure parameters of the slot, such as its length, inclination angle, and offset distance. The characteristics of the directional coupler are calculated by using even- and odd-mode analysis. After deriving synthesis equations for uniform multislot couplers, an approximation scheme is devised for nonuniform directional couplers by combining the loose coupling theory with an optimization process. Several different uniform and nonuniform couplers are then explored, and their results are shown as accurate.

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