Abstracts

A Practical Technique for Designing Multiport Coupling Networks

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A new technique is proposed for designing a passive lossless coupling network transforming any prescribed N by N symmetric immittance matrix into a corresponding N by N diagonal immittance matrix. A principal application of the technique is in the design of matching networks between N uncoupled resistive source impedances and planar antenna arrays. The technique is based upon repeated applications of Givens rotations, which can be implemented by a cascade connection of four-port directional couplers. Thus, both in the design technique and in the subsequent hardware implementation, our approach represents a significant departure from past design procedures. Existing synthesis methods involve the use of multiwinding transformers, which are impractical at microwave frequencies.

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