Abstracts

Perfectly Matched Codirectional TEM Transformers with Shielded Coupled Twin-Lines and Nonhomogeneous Dielectric Medium

R.A. Speciale. "Perfectly Matched Codirectional TEM Transformers with Shielded Coupled Twin-Lines and Nonhomogeneous Dielectric Medium." 1978 MTT-S International Microwave Symposium Digest 78.1 (1978 [MWSYM]): 332-335.

Coupled-line networks that combine the properties of matched, wideband transformers with those of wideband directional couplers are proved to be physically realizable by means of shielded four-conductor systems with nonhomogeneous dielectric, propagating TEM waves under special coupling conditions. These shielded four-conductor transmission line systems consist of mutually coupled twin-lines, lying in planes that intersect along the common median of both conductor pairs. Because of the partial longitudinal symmetry and the nonhomogeneous dielectric, balanced normal modes are propagated with different velocities. The resulting coupling is codirectional and may be almost total over a 1-to-3 relative bandwidth for any prescribed impedance transformation ratio. The necessary conditions for this kind of performance are specified, and design formulas for networks with specific transformation ratios and bandwidths are reported.

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