# Abstracts

## Exact Design of TEM Microwave Networks Using Quarter-Wave Lines

Modem network theory procedures, based on Ozaki-Ishii synthesis techniques, are reviewed for application in the design of TEM mode microwave networks using parallel coupled bars and/or series and shunt stubs. The circuit equivalences and identities obtained are theoretically valid over the entire frequency spectrum and lead to several physical configurations having identical response functions. These equivalent circuits often allow simplification of the physicrd circuitry and realization of both broad and narrow bandwidths. The problem of practical circuit configurations is discussed from the viewpoint of bandwidth and circuit element values. Neglecting multiple responses, TEM low-pass, high-pass and band-pass butterworth filters are shown to offer steeper bandedge characteristics than those of corresponding lumped element filters. The use of complementary filters to match a source and load over a wide frequency range is outlined and TEM realizations of these complements are obtained. A simple procedure for obtaining element values of butterworth complements is described. An analysis of parallel coupled filters is made and a simplified equivalent circuit is obtained. An exact synthesis procedure for parallel coupled bar filters and their equivalent forms is given. Construction details and experimental results are described for two filters which use series stubs.

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