Abstracts

Stepped-Impedance Transformers and Filter Prototypes

L. Young. "Stepped-Impedance Transformers and Filter Prototypes." 1962 Transactions on Microwave Theory and Techniques 10.5 (Sep. 1962 [T-MTT]): 339-359.

Quarter-wave transformers are widely used to obtain an impedance match within a specified tolerance between two lines of different characteristic impedances over a specified frequency band. This paper gives design formulas and extensive tables of designs, most of which were especially derived so that an integrated account could be presented for the first time. Numerous examples are given. Only homogeneous, synchronous transformers and filters are included in this paper, but a short bibliography on related topics is appended. The theory is also applied to band-pass filters, by showing how to convert quarter-wave transformers into half-wave filter prototypes. The theoretical and numerical results presented are applicable to the design of impedance transformers, direct-coupled cavity filters, short-line low-pass filters, optical antireflection coatings and interference filters, acoustical transformers, branch-guide directional couplers, TEM-mode coupled-transmission-line directional couplers, and other circuits. These applications have been or will be dealt with in separate papers; this paper gives the basic theory and some of the numerical data required for these applications.

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