Abstracts

Synthesis and Realization of Narrow-Band Canonical Microwave Bandpass Filters Exhibiting Linear Phase and Transmission Zeros

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The present study is concerned with the synthesis and realization of narrow-band canonical microwave bandpass filters exhibiting additional couplings between nonsuccessive resonant circuits. These bypass couplings effect, on the one hand, attenuation poles at finite frequencies and, on the other hand, make the bandpass filter nonminimum-phase, and therefore offer degrees of freedom for group delay equalization in the passband. The realization of canonical network structures with bypass couplings is possible by extracting from the chain matrix an ideal transformer, the input of which is connected, for example, in shunt with and its output in series with the remainder two-port. The extraction is associated with the reduction by 2 of the degree of the denominator polynomial of the chain matrix elements. To realize a clear correlation between the bypass elements and the electrical performance, canonical structures with sections that are bypassed only once or twice are proposed. Theoretical and measured curves of the examples of realization for 1235 MHz, consisting of coaxial cavities, and for 4000 MHz, consisting of dual-mode cavities, are seen to be in close agreement.

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