Abstracts

Analysis and Composition of a New Microwave Filter Configuration with Inhomogeneous Dielectric Medium

A. Fukasawa. "Analysis and Composition of a New Microwave Filter Configuration with Inhomogeneous Dielectric Medium." 1982 Transactions on Microwave Theory and Techniques 30.9 (Sep. 1982 [T-MTT] (Special Issue on Microwave Filters)): 1367-1375.

A theoretical study has been undertaken to solve inter-resonator coupling problems, and to design a new structure of microwave bandpass filter. This filter is composed of quarter-wavelength resonators arranged in a housing with the same ends short-circuited. This arrangement of resonators has never been utilized to compose bandpass filters because of the small inter-resonator coupling. The coupling coefficient of TEM resonant lines has been derived theoretically and expressed with capacitive parameters of the coupled lines. The accurate values of capacitances of the lines were obtained by the numerical analysis of the TEM field. By a simple method to make the medium inhomogeneous through removing the dielectric partially, a simplified structure of filter has first been realized based on the theory. Through numerical analysis by the finite difference method, this structure is also shown to have higher unloaded Q of resonator than conventional dielectric-filled coaxial filters to minimize the volume of filters.

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