Abstracts

TEM modeling of parasitic bandwidth expansion in combline filters

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Combline filters frequently exhibit wider bandwidths than their network models, which are synthesized and analyzed as TEM coupled line arrays. In this paper, a TEM-based model for that phenomenon, which is additive to standard combline TEM models, is presented, along with practical formulas and a method to calculate its elements by smart use of electromagnetic (EM) simulators. The TEM-based explanation can bridge the gap between TEM modeling of combline filters and the evanescent waveguide representation of the entire combline structure. By investigating the distortion of the TEM EM-field pattern at the resonator open ends, other modes of propagation can be observed, significantly affecting the coupling between the resonators in that region, which creates the bandwidth expansion. This analysis agrees with an evanescent waveguide analysis of combline filters, but assumes faster and less expensive design and analysis tools.

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