Abstracts

A revision of cascade synthesis theory covering cross-coupled filters

N. Yildirim, O.A. Sen, Y. Sen, M. Karaaslan and D. Pelz. "A revision of cascade synthesis theory covering cross-coupled filters." 2002 Transactions on Microwave Theory and Techniques 50.6 (Jun. 2002 [T-MTT]): 1536-1543.

The classical zero-shifting technique is generalized to cover extraction of complex transmission zeros (TZs) in the form of fourth-order LC sections whereby the j/spl omega/- and /spl alpha/-axis TZs appear as special cases. Using this approach, bandpass filters can be synthesized in direct coupled resonator forms by pole placement instead of designing them through low-pass prototypes. By using circuit transformations, the resulting direct coupled resonator filter circuits can then be transformed into a variety of cross-coupled forms like a fully cross-coupled form or cascaded N-tuplet form. It is shown that one or more finite j/spl omega/-axis, /spl alpha/-axis, or complex TZs can be extracted as direct coupled resonator circuit blocks, which can be converted into cross-coupled triplets, quadruplets, or other N-tuplets of resonators. In particular, it is shown that a cascaded quadruplet section can be used to realize a complex TZ quadruplet S/sub i/ = /spl plusmn//spl sigma//sub i/ /spl plusmn/j/spl omega//sub i/, as well as two pairs of j/spl omega/-axis TZs, S/sub i/ = /spl plusmn/j/spl omega//sub i/, and S/sub k/ = /spl plusmn/j/spl omega//sub k/.

❑ Return to main document.