Abstracts

Using parallel resonators to create improved maximally flat quarter-wavelength transformer impedance-matching networks

This paper presents a general approach for designing maximally flat quarter-wave transformer impedance-matching networks (QWT-IMNs) used in conjunction with parallel resonators. The approach used finds a maximally flat form by setting lower order terms of the general form to zero. This general form is found using ABCD matrices. The resulting maximally flat form is identical to the form for quarter-wavelength-coupled filters. Using parallel resonators improves QWT-IMN designs in three ways. First, adding parallel resonators to a QWT-IMN improves the poor stopband rejection from which QWT-IMN's suffer. Second, for a given load-to-source mismatch, a QWT-IMN has a fixed response, i.e., a fixed total Q. By using more than one parallel resonator, numerous response realizations, i.e., values of total Q, can be achieved for a given load-to-source mismatch. Third, using parallel resonators requires one less quarter-wave transformer to achieve the same order of response.

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