# Abstracts

## Filters with Single Transmission Zeros at Real or Imaginary Frequencies

A new unified theory is presented for the synthesis of exactly equiripple low-pass prototypes having: a) one simple pole of attenuation at a real frequency; or b) a single pair of real-axis transmission zeros (giving linear-phase performance). These types of filters may be regarded as representing the least possible degree of complication over the conventional Chebyshev filter, and are usually realized with one extra cross coupling in the structure. It is demonstrated that this gives much improved skirt selectivity in the case of a finite frequency pole, making it a viable intermediate case between the Chebyshev and elliptic function filters, while in the case of real-frequency zeros, very flat group delay over 50 percent of the passband is achieved with minimal cost in insertion loss and skirt rejection. Approximate and exact synthesis techniques are described, including results for the previously neglected odd-degree case. Experimental results demonstrate agreement with theory.

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