

PAPER # 5

- **TITLE:**

On the Analysis and Design of Fractional-Order Chebyshev Complex Filter.

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- **JOURNAL:** Circuits Systems and, Signal Processing
- **ABSTRACT:**

This paper introduces the concept of fractional-order complex Chebyshev filter. A fractional variation of Chebyshev differential equations is introduced based on Caputo fractional operator. The proposed equation is solved using fractional Taylor power series method. The condition for fractional polynomial solutions is obtained and the first four polynomials scaled using an appropriate scaling factor. The fractional order complex Chebyshev low-pass filter based on the obtained fractional polynomials is developed. Two methods for obtaining the transfer functions of the complex filter are discussed. Circuit implementations are simulated using Advanced Design System (ADS) and compared with MATLAB numerical simulation of the obtained transfer functions to prove the validity of the two approaches.