Speaker: Yifei Pu, College of Computer Science, Sichuan University, China

Title : Analog Circuit Implementation of Fractional-Order Memristor: Arbitrary-Order Lattice Scaling Fracmemristor.

Abstract: In this work, based on fractional calculus, the fractional-order memristor, an arbitrary-order fracmemristor, is proposed to be implemented in the form of a lattice scaling analog circuit. Since the concept of the memristor is generalized from the classic integer-order memristor to that of the fractional-order memristor, fracmemristor, it is natural to ponder a challenging theoretical problem to propose a circuit theoretic methodology to achieve an arbitrary-order memristor by using the ordinary memristor and capacitor or inductor in the form of an analog circuit. Motivated by this need, in this work, we propose an interesting analog circuit implementation method of an arbitrary-order memristor. The first step is the proposal for a novel feasible analog circuit implementation of an arbitrary-order lattice scaling fracmemristor. In particular, the hardware achievement of this arbitrary-order lattice scaling fracmemristor is mathematically derived and analyzed in detail. Secondly, the approximation performance, electrical characteristics, especially fingerprint, and analog circuit achievement of an arbitrary-order fracmemristor are analyzed in detail experimentally, respectively. The main contribution of this work is the proposal for the first preliminary attempt of a feasible hardware achievement of an arbitrary-order fracmemristor and for the recognition of the fingerprint of fracmemristor.

Biography: Yi-Fei PU is a Full Professor and Doctoral Supervisor with the College of Computer Science, Sichuan University and is elected into the Thousand Talents Program of Sichuan Province and the Academic and Technical Leader of Sichuan Province. He focuses on the application of fractional calculus to signal processing, image processing, circuits and systems, and machine intelligence.