



“Wideband Operational Transconductance Amplifiers for Gigahertz Applications”

Presented by

Dr. Carlos Saavedra

Associate Professor, Department of Electrical and Computer Engineering,
Queen's University, Kingston, Ontario, Canada

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Place: University of Calgary, ICT Building, Room ICT516

This event is free and open to all. Refreshments will be available.

ABSTRACT

The versatility and usefulness of operational transconductance amplifiers (OTA's) largely stems from the fact that they can be used as building blocks to make circuits with more advanced capabilities. While analog designers have been using OTA's for a considerable period of time, only recently has the RF community started to make more use of this class of circuits. In this talk, a fully differential CMOS OTA that uses a feedforward-regulated cascode topology will be presented first. The feedforward configuration provides the OTA with a wideband frequency response of 10 GHz and it also allows the OTA to handle large RF signals. The second part of the talk will be devoted to novel microwave circuits that we have designed and fabricated in our group using the above OTA. One such circuit is a 360° vector sum phase shifter operating in the 2-3 GHz band that uses an OTA to generate the quadrature basis vectors. The phase shifter has an RMS phase error below 5° and its gain error is below 1.2 dB over the measured frequency band. Another circuit is a 5.4 GHz reconfigurable modulator that can generate a multiplicity of QAM modulation formats. Measured results will be presented when the circuit is operating in 4-QAM and 16-QAM modes. The last circuit to be discussed is an active quasi-circulator using two OTA's that has less than 3 dB of loss and a measured isolation of over 26 dB between the isolated ports.



BIOGRAPHY

Carlos Saavedra is an Associate Professor in the Department of Electrical and Computer Engineering at Queen's University and he served as Graduate Chair of his department from 2007 to 2010. He is a member of the Steering Committee of the 2012 IEEE International Microwave Symposium and is a member of the Technical Program Committee of the IEEE RFIC Symposium.

Dr. Sebastian Magierowski

Chair, IEEE CAS/SSC Chapter

Tel: 403-220-4973. Email: smagiero@ucalgary.ca