Seminar Talk

Irina Winter-Arboleda
PhD Candidate
Department of Electrical & Computer Engineering
Old Dominion University

Friday, March 29, 2019
3:00 p.m. KH 224

Title: On Analytic Nonlinear Input-Output Systems: Expanded Global Convergence and System Interconnections

Abstract:

Functional series representations of nonlinear systems first appeared in engineering in the early 1950's. One common representation of a nonlinear input-output system are Chen-Fliess series or Fliess operators. Such operators are described by functional series indexed by words over a noncommutative alphabet. They can be viewed as a noncommutative generalization of a Taylor series. A Fliess operator is said to be globally convergent when its radius of convergence is infinite, in other words, when there is no a priori upper bound on both the L_1- norm of an admissible input and the length of time over which the corresponding output is well defined. If such bounds are required to ensure convergence, then the Fliess operator is said to be locally convergent with a finite radius of convergence. However, in the literature, a Fliess operator is classified as locally convergent or globally convergent based solely on the growth rate of the coefficients in its generating series. The existing growth rate bounds provide sufficient conditions for global convergence which are very conservative. Therefore, the first main goal is to develop a more exact relationship between the coefficient growth rate and the nature of convergence of the corresponding Fliess operator and the second main goal of is to show that the global convergence of Fliess operators is preserved under the nonrecursive interconnections.

Bio:

Irina Winter-Arboleda is currently a PhD candidate in Electrical and Computer Engineering at Old Dominion University. She received the B.S. and M.S. degrees in Mathematics and graduated with Honors from Pontifical Catholic University of Peru, Peru. Her doctoral dissertation focuses on the analytic aspects of nonlinear input- output systems. As a recognition of her work, she was awarded "Teaching Assistant Award for Outstanding Achievement of the Year 2017" and the "Alumni Association Outstanding Scholar Fellowship of the Year 2016" by Old Dominion University. She is currently working at VMASC and she will start in a new position as Data Scientist Associate, Sr. at JP Morgan Chase & Co. in April.