Good Afternoon,
You are invited to attend our weekly ECE Graduate Seminar.

Old Dominion University
College of Engineering and Technology
Department of Electrical and Computer Engineering

All lectures to be held at 3:00pm on Fridays online at
[ODU DL: ECE 731 831 Grad Seminar](#)
For more information, contact Dr. Chung Hao Chen at (757) 683-3475 or email cxchen@odu.edu.

Friday, September 10, 2021 Seminar Topic:

ADDITIVE STATUS FEEDBACK CONNECTION: A CHEN-FLIESS SERIES VIEWPOINT by Dr. Subbarao Venkatesh Guggilam, Ph.D., Graduate from the Department of Electrical & Computer Engineering at Old Dominion University

Abstract:
Michel Fliess, in 1981, proved that an analytic dynamical system with input entering linearly has an input-output description written purely in terms of sum of weighted iterated integrals, called Chen-Fliess series. The expressions of iterated integrals can be symbolized by words formed out of noncommutative letters or indeterminates. Hence, the input-output description of such analytic vector fields can be described by a Chen-Fliess series whose underlying descriptor is a formal power series. The problem considered in the seminar is when does a Chen-Fliess series in an additive static feedback connection with a formal static map (denition of the map does not inherently depend on time) yield a closed-loop system with a Chen-Fliess series expansion? One can prove that such a closed-loop system always has a Chen-Fliess series representation. Furthermore, an algorithm based on the Hopf algebras for the shuffle group and the dynamic output feedback group is designed to compute the generating series of the closed-loop system. It is proved that the additive static feedback connection preserves local convergence and relative degree, but a counterexample shows that the additive static feedback does not preserve global convergence in general. The results presented are a part of the Ph.D. dissertation of the speaker. The talk will begin with a slight introduction to Chen-Fliess series.

Bio:
Subbarao Venkatesh Guggilam obtained his Ph.D. in Electrical and Computer Engineering under Prof. Steven W. Gray in the Old Dominion University, Norfolk, Virginia in August 2021. His research focus is primarily on the Mathematical Systems Theory and their applications towards to science and engineering. He has a Master of Science in Computer Science from Chennai Mathematical Institute, India and also a Master of Technology in Systems and Control, from Indian Institute of Technology, Bombay, India. He received his Bachelor of Technology in Electronics and Instrumentation from Amrita Vishwa Vidyapeetham, India. As of the present date, he is en route to begin his Postdoc in Virginia Modeling, Simulation and Analysis Center, Suffolk, Virginia. During the course of his Ph.D. (2017-21), he has published 7 conference papers (in reputed conferences like CDC, MTNS etc.) and two journals (Systems and Control, Automatica), with another 2 journals in the pipeline. During this time, he was a part of the NSF project work that developed a system identification tool that was based on discretized signatures of the input-output data as the regressors.