

Novel Lyapunov-Type Functional for Robust Control of General Time-Varying Delay Stochastic Uncertain Systems



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Abstract

Time delay does broadly exist in systems. General time-varying delay stochastic uncertain systems are so common and important in the areas of science and engineering because they cover other kinds of time-delay systems as special cases of them. When the systems come with noises or Brownian motion as called Wiener Process, how to robustly control these systems is a tough challenge.

This seminar is to present a novel Lyapunov-type functional to effectively treat these general cases where the state derivative does not exist due to Brownian motion, and the derivative of time-varying delay may be any bounded values, as well as the systems may have structural uncertainties, i.e., a difficult task as known in the literature. Based on this novel Lyapunov-type functional, the robust control method is further developed by applying singular value decomposition (SVD) to all structural uncertainties, then utilizing the slide mode control (SMC) and linear matrix inequality (LMI) for the controller design. The theoretical results are provided. Furthermore, the simulation of the literature examples demonstrates the correctness of the presented new methods, which outperform the existing methods and the state-of-the-art.

Speaker's Biography

Prof. Sheng-Guo Wang received his BS and MS in EE from University of Science and Technology of China in Beijing 1967 and Hefei 1981, respectively, and PhD in ECE from University of Houston in 1994. He is currently a professor at University of North Carolina at Charlotte. He has published more than 100 refereed papers. He has been the PI for numerous various research projects since 1974. His academic service includes Associate Editor for journals, and Program Committee Member and Session Chair for international conferences.

Prof. Wang is a recipient of many academic awards, including 1978 China National Science Conference Award (one of the highest academic honor in China), US Fulbright Senior Scholar as Fulbright-PolyU Senior Scholar in HK 2016-17 (the flagship international educational exchange program in the world), British Council Scholar 1989-90, Sigma Xi Research Excellence Award (UH Chapter) 1994, Outstanding Faculty PVAMU 1997, and the US National 2015 "Sweet 16" High Value Research Project Award, etc..

*****All Interested Are Welcome *****

***For further information, please contact Ms. Autumn Lin at Tel. 3400 8535.
Certificates of attendance will be provided to participants if they attend the whole lecture.***

