Systems and Control Group Seminar
24 November, 2023, 11:00

Mathematics Department, University of Aveiro, Room 11.2.25

11:00

On the Qualitative Behaviors of Solutions of Nonlinear Delay Integro-Differential Equations

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Abstract: This paper discusses qualitative properties of solutions of certain unperturbed and perturbed systems of nonlinear integro-delay differential equations, namely asymptotic stability, uniform stability, integrability and boundedness. Here, four theorems are proved on these properties of solutions by using Lyapunov–Krasovskii functional technique. An example is also given to illustrate the application of the results.

11:45

Simplex Codes, Shuffles and Applications to the Decoding of Certain Convolutional Codes

Michael Schaller, University of Zurique, michael.schaller@math.uzh.ch

Abstract: Two of the most important problems in coding theory are the construction of codes with good minimum distance and the efficient decoding of such codes. For convolutional codes the two most important notions of distance are the free distance and the column distances. Abreu, Lieb and Rosenthal constructed convolutional codes with optimal column distances for the binary field for certain code parameters. These codes are related to simplex codes which are linear block codes. Simplex codes admit a fast decoding algorithm using the fast Hadamard transform which is related to perfect shuffles. We leverage the decoding algorithm for the simplex code to modify the Viterbi algorithm and speed it up for these particular convolutional codes. This is ongoing work with Zita Abreu and Julia Lieb.