CIDMA CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

Systems and Control Group Seminars

19 march 2025, 3:00 pm, Room 11.2.25

Mathematics Department, University of Aveiro

3:00 pm

A class of optimal binary convolutional codes and its efficient decoding algorithm

Zita Abreu (CIDMA, University of Aveiro) zita.abreu@ua.pt

Abstract: There are Singleton-like upper bounds for the column distances of convolutional codes, achievable if the finite field is large enough. However, the required field size is unclear, and existing constructions need very large fields. Instead of determining this size, we fix the field and explore possible column distances. We construct binary convolutional codes achieving the highest possible column distances, linked to binary first-order Reed-Muller codes. This connection enables an efficient decoding algorithm, a lower-complexity version of the Viterbi algorithm.

3:30 pm

Solving Real-World Problems with Fractional Differential Equations

Ricardo Almeida (CIDMA, University of Aveiro) ricardo.almeida@ua.pt

Abstract: This talk is devoted to the study of nonlinear fractional differential equations involving Caputo-type fractional derivatives with respect to another function. We establish existence and uniqueness results for these equations using some standard fixed point theorems. Furthermore, we present several applications of these results, specifically in optimal control theory, population growth models, and epidemiological models.

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