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

Systems and Control Group Seminar

June 16, 2026, 11:00, Room 11.2.6 (Sousa Pinto)

11:00 pm

Convergence towards discontinuous stationary solutions for a hybrid reaction-diffusion system applied to forest ecology

Guillaume Cantin

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Abstract: In this talk, I will present recent results on the dynamics of a hybrid reaction-diffusion system modeling a forest ecosystem perturbed by an intense fire regime. I will focus on the existence of an infinite family of discontinuous stationary solutions, whose stability is modified by the action of the probabilistic process reproducing the impact of fires. The loss of stability is studied through a computational treatment, relying on a statistical model checking framework taken from formal methods.

11:30 pm

Bilinear optimal control of distributed-order diffusion equations

Faiçal Ndaïrou

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Abstract: In this talk we will be analyzing optimal control problem governed by a diffusion equation involving a distributed–order time–fractional derivative and a bilinear control term. The proof of existence and uniqueness of solution for the controlled evolution equation is first obtained. Then, we analyze the Fréchet differentiability of the control–to–state mapping. The admissible control set is defined in the space of essentially bounded functions. This set is closed and leads to the derivation of a strong first–order necessary optimality condition in the sense of a minimum principle. Finally, an illustrative example is presented to demonstrate the applicability of the obtained results.

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