

## SEMINAR OF ANALYSIS

**THURSDAY 09 June 2022 - Room: MA A1 10 at 3.15 pm**

**Prof. Amaury HAYAT** (Ecole des Ponts Paristech. - FR)

will present a seminar entitled:

« Stabilization of 1D systems of PDEs »

Abstract:

As part of control theory, stabilization consists in finding a way to make stable a trajectory of a system on which one has some means of action.

In this talk, we will discuss recent advances in stabilization of PDEs, starting with one of the most natural approaches for nonlinear systems, quadratic Lyapunov functions, to more complex approaches such as Fredholm backstepping. With quadratic Lyapunov functions, we will focus on hyperbolic systems and see that adding an arbitrarily small viscosity can have a paradoxical effect, either robustifying or destroying the stability.

Backstepping, on the other hand, is a way of looking at the problem differently: it consists in finding a control operator such that the PDE system can be invertibly mapped to a simpler PDE system for which stability is known. Surprisingly powerful, this approach offers the possibility to deal with very general classes of systems. We will review the origin of the method and present new results that resolve a question opened in 2017 and illustrate it on the rapid stabilization of the linearized water-wave equations.

Lausanne, June 2, 2022

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Seminars are announced on the Mathematics Section website: <http://memento.epfl.ch/math/>