Explicit stabilized integrators for stiff systems: from deterministic to stochastic (partial) differential equations

Gilles Vilmart
University of Geneva, Switzerland
gilles.vilmart@unige.ch

Explicit stabilized integrators are an efficient and popular alternative to implicit or semi-implicit methods to avoid the severe timestep restriction faced by standard explicit integrators applied to stiff dissipative systems of differential equations.

In this talk, we explain how the versatility of explicit stabilized methods permits to integrate efficiently in time not only deterministic dissipative systems, but also stiff SDEs. We then analyze how such explicit stabilized methods with optimally large stability domains also apply to the case of semilinear parabolic SPDEs.

Joint work with Assyr Abdulle† (EPF Lausanne), Ibrahim Almuslimani (INRIA Rennes), Charles-Edouard Bréhier (University of Pau) and Konstantinos C. Zygalakis (University of Edinburgh).