PhD OPENING 2026

March 19th, 2026 from 14:15

Room **A109**
Polo Ferrari 1
Via Sommarive 5 – Povo

PhD Program in Mathematics

14:15

Welcome

Willem Adriaan De Graaf (PhD Coordinator)

14:30
Maxime Breden
Department of Applied Mathematics, Ecole Polytechnique

An introduction to computer-assisted proofs for nonlinear equations: how to turn a numerical simulation into a theorem

Abstract: The goal of *a posteriori validation methods* is to get a quantitative and rigorous description of some specific solutions of nonlinear ODEs or PDEs, based on numerical simulations. The general strategy consists in combining a priori and a posteriori error estimates, interval arithmetic, and a fixed point theorem applied to a quasi-Newton operator. Starting from a numerically computed approximate solution, one can then prove the existence of a true solution in a small and explicit neighborhood of the numerical approximation.

I will first present the main ideas behind these techniques on a simple example, then describe a rather general framework in which they can be applied, and finally, time permitting, discuss some applications in fluid dynamics or population dynamics.

15:45
Small Break

16:00
XLI cycle PhD Students Presentation

Information
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