ML-Based Approaches for Computer-Assisted Proofs in PDE

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Abstract

In this talk, I will discuss how machine learning techniques can help in the rigorous analysis of partial differential equations (PDEs), such as using neural networks to compute high-precision approximate solutions to problems in fluid dynamics. These numerically generated approximations serve as initial candidates in computer-assisted proofs, where interval arithmetic and fixed-point arguments are employed to prove the existence of exact solutions in a neighborhood of the computed approximations. This is joint work with Javier Gómez-Serrano.