TS6: Thematic Session: Algebra and Machine Learning

Monday 30 June, 14:00–16:00 • Room 110

Fernando Martin-Maroto and Antonio Ricciardo (Champalimaud Foundation and Algebraic AI)

Time: 14:00–16:00

How Algebra can help Machine Learning

Subdirect decomposition offers an algebraic foundation for machine learning, presenting a compelling alternative to traditional statistical methods. We will give a comprehensive introduction to Algebraic Machine Learning (AML), an approach that leverages subdirect decomposition to solve regression and classification tasks, with accuracy comparable to multilayer perceptrons. Moreover, it has the unique feature of being able to learn to solve complex combinatorial problems—such as Hamiltonian cycle detection—directly from problem descriptions.

We will give an introduction to the AML framework, comprehending an introduction to atomized semilattices, a mathematical representation tool for semilattices at the core of AML, and showcase the example of solving the Hamiltonian cycle problem.
