

# PhD in Computational Mathematics, Learning, and Data Science

## 3<sup>th</sup> cycle – First Year Final Report

Gabor Riccardi

### Course attendance

- **Nonlinear approximation,**  
*Held by* Prof. Carlo Marcati, Prof. Pietro Zanotti, at the University of Pavia.  
28 hours – with final exam.
- **TeX/LaTeX,**  
*Held by* Jonathan Franceschi, at the University of Pavia.  
12 hours – with final exam. - Transversal course.
- **Computation Optimal Transport,**  
*Held by* Prof. Stefano Gualandi, at the University of Pavia.  
19 hours.
- **Integer Programming and Combinatorial Optimization,**  
*Held by* Prof. Sophie Huiberts, Prof. Neil Olver, Prof. Vera Traub at the Institute of Computer Science, University of Wrocław, at the University of Breslavia.  
12 hours.

### Projects and Research Activity

- Internship at the Joint Research Centre in Ispra in the project "Resilience assessment of energy systems" for a duration of 5 months in Ispra (VA, Italy). On the generation of scenarios for contingencies in the energy grid and development of a decomposition algorithm for the capacity expansion of the grid.
- Presentation of the work "A decomposition algorithm for the capacity expansion of the grid" at the conference [AIROYoung](#), at the workshop [HEXAGON](#) and at the poster session at [COMPMAT workshop](#) and at the conference [IPCO](#).
- Presentation of the joint work "Projective metrics in coding theory" done in collaboration with the PhD student Sauerbier Couvée, for the project "Reading seminars" supervised by Professor Stefano Gualandi.
- Worked on the project "A linear relaxation of the ACOPF based on loop constraints" with PhD student Ambrogio Maria Bernardelli presented at the workshop [HEXAGON](#).
- Participation in the "16th AIMMS-MOPTA Optimization Modeling Competition" with master student Bianca Urso and with Prof. Stefano Gualandi. Presentation of our work "Modeling a Fully Renewable Energy Grid with Hydrogen Storage: An Iterative Time Aggregation Approach" at the conference [MOPTA 2024](#) at Lehigh University in Bethlehem, PA. Third place out of 16 teams.

Pavia – September 13, 2024

*Gabor Riccardi*

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Tutor: *Prof. Stefano Gualandi*

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