Seta Rakotomandimby

https://setar0202.github.io/ | seta.rakotomandimby@enpc.fr | +33 6 51 72 77 56

Summary

PhD student at Cermics lab at École nationale des ponts et chaussées, my research topics are losses based on subdifferential representations for multiclassification in machine learning and nonconvex dual methods to solve sparse minimization problems. I graduated from the highly recognized engineering school ENSTA Paris in applied mathematics and from the Parisian operational research master (MSc) MPRO.

Research experiences

PhD: Algorithms in Generalized Convexity Application to Sparse Optimization
Cermics, École nationale des ponts et chaussées — November 2023 - present

Supervisor: Michel De Lara. Study of nonconvex dual methods to solve sparse minimization problems. Design of convex new losses in supervised learning using convex representations of maximal monotone operators.

PhD Visiting period at the Interactive Optimization and Learning research lab
Interactive Optimization and Learning research lab, Zuse Institute Berlin — March 2025 - May 2025

Supervisor: Sebastian Pokutta. Implementation of a (nonlinear) Capra-cutting planes method with the `SCIP` solver in `Julia`. Contribution to the `FrankWolfe.jl` package by implementing SOCGS method, which resulted in an accepted paper at NeurIPS 2025.

Internship: Perturbation-Duality Scheme in Combinatorial Optimization and Algorithms in Generalized Convexity
Cermics, École des Ponts ParisTech — April 2023 - September 2023

Supervisor: Michel De Lara. Application of the (Rockafellar) perturbation-duality scheme to integer linear duality. Implementation of a Capra cutting plane method for sparse minimization problems in `Julia`.

Internship: Information Theoretic Clustering Based on Data Compression Principles
Machine Learning group, University of Eastern Finland — May 2022 - August 2022

Supervisor: Pasi Fränti. Minimum description length principle in `C/C++` for K-Means parameter selection.

Education

2022 - 2023 **Operational Research Master MPRO (MSc)** (GPA: $\sim$ 4.0)
at Conservatoire Nationale des Arts et Métiers (CNAM), Paris

2020 - 2023 **Applied Mathematics Engineering Degree (MSc)** (GPA: 3.96)
at École Nationale des Techniques Avancées (ENSTA) Paris

2017 - 2020 ***Classe Préparatoire*** at Lycée Kléber, Strasbourg, France

Three years of very demanding courses (about 35 hours per week of science courses, mostly in Mathematics and Physics, with about the same amount of personal work) are dedicated to the preparation for nationwide, extremely competitive exams.

Publications & preprints

[1] Seta Rakotomandimby, Jean-Philippe Chancelier, Michel De Lara, and Mathieu Blondel. Learning with Fitzpatrick losses. In *The Thirty-eighth Annual Conference on Neural Information Processing Systems*, 2024. link.

[2] Seta Rakotomandimby, Jean-Philippe Chancelier, Michel De Lara, and Adrien Le Franc. Subgradient selector in the generalized cutting plane method with an application to sparse optimization. *Optimization Letters*, pages 1–18, 2025. link.

[3] Adrien Le Franc, Jean-Philippe Chancelier, Michel De Lara, and Seta Rakotomandimby. What are Capra-Convex Sets? *arXiv preprint arXiv:2509.06392*, 2025. link.

[4] Jannis Halbey, Seta Rakotomandimby, Mathieu Besançon, Sébastien Designolle, and Sebastian Pokutta. Efficient quadratic corrections for frank-wolfe algorithms. *arXiv preprint arXiv:2506.02635*, 2025. ACCEPTED In The Thirty-Ninth Annual Conference on Neural Information Processing Systems. link.

Award

2024 Operations Research and Decision Support Master's Thesis Prize