

Thu-Le Tran

PhD in Mathematics
Université de Rennes 1, France

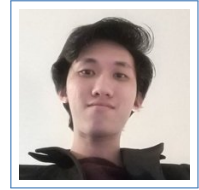
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📧 [Tran-Thu-Le](#)



Research Interests

Optimization **Convexity, Non-smoothness, Sparsity**
Applications **Machine Learning, Statistics, Signal/Image Processing**
Techniques **Safe Screening (Feature Selection & Dimensionality Reduction), gradient and proximal algorithms, Fenchel-Rockafellar & Lagrange duality, ...**

Education

2020-2023 **PhD in applied Optimization**, *Université de Rennes 1, France*
2019-2020 **Master 2 in Fundamental Mathematics**, *Université de Rennes 1, France*
2018-2019 **Master 1 in Mathematical Analysis**, *Can Tho University, Vietnam*
2014-2018 **Bachelor in Mathematics**, *Can Tho University, Vietnam*

Teaching Experience

2021-2022 Teaching assistant for **Convex Optimization** at [ENSAI](#), France

Awards and Honors

2019 **Lebesgue Master Scholarship** of Henri Lebesgue Center for outstanding students
2014-2018 03 bronze & 04 silver medals of **National Mathematics Olympiad** for students

Selected Publications

- 2023 [Thu-Le Tran](#), Clément Elvira, Hong-Phuong Dang, Cédric Herzet, *One to beat them all: "RYU" – A unifying framework for the construction of safe balls*, **SIAM Journal on Optimization** (submitted)
- 2023 [Thu-Le Tran](#), Clément Elvira, Hong-Phuong Dang, Cédric Herzet, *Dimensionality reduction for convex optimization based on safe regions: A unified approach*, **10th Vietnam Mathematical Congress** (abstract submission)
- 2022 [Thu-Le Tran](#), Clément Elvira, Hong-Phuong Dang, Cédric Herzet, *Beyond GAP screening for Lasso by exploiting new dual cutting half-spaces*, **30th European Signal Processing Conference (EUSIPCO)**
- 2022 [Thu-Le Tran](#), Clément Elvira, Hong-Phuong Dang, Cédric Herzet, *Une nouvelle méthode d'accélération pour LASSO par élimination sûre de variables*, **CAP 2022-Conférence sur l'Apprentissage automatique**

- 2021 Van Huy Pham, Kien Trung Nguyen, and Tran Thu Le, *Inverse stable point problem on trees under an extension of Chebyshev norm and bottleneck Hamming distance*, **Optimization Methods and Software**
- 2019 Kien Trung Nguyen, Nguyen Thanh Hung, Huong Nguyen-Thu, Tran Thu Le, and Van Huy Pham, *On some inverse 1-center location problems*, **Optimization**
- 2019 Kien Trung Nguyen and Tran Thu Le, *A linear time algorithm for balance vertices on trees*, **Discrete Optimization**
- 2018 Tran Thu Le and Kien Trung Nguyen, *A Generalization of Inverse Single Facility Location Problems on Trees under an Extension of Chebyshev Norm and Bottleneck Hamming Distance*, **9th Vietnam Mathematical Congress** (abstract submission)

Computer Skills

Programming Python, Julia, R
 Markup lang. Latex, Markdown, Typst, Quarto
 System Linux

Languages

Vietnamese Native
 English Fluent
 French Basic

PhD Thesis

My PhD thesis, titled “Some Contributions on Safe Regions and Safe Screening in Convex Optimization”, focuses on addressing the following convex optimization problem:

$$\min_{\mathbf{x} \in \mathcal{X}} f(\mathbf{Ax}) + g(\mathbf{x}).$$

This problem finds significant applications across various disciplines, including:

- Statistics: LASSO, Ridge, Elastic-net, sparse logistic regression, ...
- Machine Learning: sparse SVM, one-hidden layer neural networks, ...
- Signal and Image Processing: basis pursuit denoising, sparse spike deconvolution, ...

Solving these problems in high dimensions is challenging due to computational and memory constraints. In recent years, “safe screening” methods have emerged as powerful tools to address this issue, operating by utilizing a “safe region” which contains a dual optimal solution.

The first contribution of the thesis is a mathematical framework for creating new safe regions while demonstrating their superiority over the state-of-the-art. Our framework also provides an elegant way to **unify** existing safe regions. This contribution establishes a theoretical foundation for future advances in the study of safe regions. The second contribution **extends** the safe screening methodology to problems in infinite dimensions. We show, in particular, that integrating this method into a state-of-the-art algorithm significantly reduces its numerical complexity while preserving its convergence properties. This contribution highlights the potential of safe screening to effectively address computational challenges in infinite-dimensional contexts.