

Antoine Béreau

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SUMMARY

Former PhD Student at École polytechnique and Inria in the TROPICAL team working on the topic of tropical polynomial system solving using game theoretical tools, now teaching mathematics in highschool.

Research interests: Tropical geometry, polynomial system solving, polyhedra, mean payoff games, resultant theory, symbolic computation, combinatorics

EDUCATION

Present	Highschool math teacher at Lycée de Cachan
2024	PhD at CMAP (École polytechnique) and Inria Saclay in the TROPICAL team supervised by Marianne Akian and Stéphane Gaubert on the topic of tropical polynomial system solving using game theoretical tools
2021	Master's degree at ENS Rennes and Sorbonne Université <i>mention très bien</i> (16.275/20)
2020	<i>Agrégation de mathématiques</i> (ranked 47)
2018	Bachelor's degree at ENS Rennes and Université Rennes 1 <i>mention très bien</i> (16.000/20)
2017	Admission at École Normale Supérieure de Rennes (ENS Rennes)
2014	<i>Baccalauréat Scientifique mention très bien</i> (18.000/20)

PUBLICATIONS & PREPRINTS

The Nullstellensatz and Positivstellensatz for Sparse Tropical Polynomial Systems 2025
(Extended version of the ISSAC' 23 article)

Marianne Akian, Antoine Béreau, Stéphane Gaubert

Accepted by the *Journal of Foundations of Computational Mathematics* in February 2025

<https://arxiv.org/abs/2312.05859>

Eigenvalue Methods for Sparse Tropical Polynomial Systems 2024

Marianne Akian, Antoine Béreau, Stéphane Gaubert

Lecture Notes in Computer Science in the proceedings of ICMS 2024

https://doi.org/10.1007/978-3-031-64529-7_31

The Tropical Nullstellensatz and Positivstellensatz for Sparse Polynomial Systems 2023

Marianne Akian, Antoine Béreau, Stéphane Gaubert

ISSAC '23: *Proceedings of the 2023 International Symposium on Symbolic and Algebraic Computation*

<https://doi.org/10.1145/3597066.3597089>

SOFTWARES

Tropical Polynomial System Solving (see the project on Gitlab: [🔗](#))

This project consists in a Python implementation of tropical polynomial and matrices, full and sparse, as classes, and provides some base tools to work with these objects, in particular to examine the solvability of a sparse tropical polynomial system.

GRANTS & AWARDS

2023 ISSAC 2023 Distinguished Student Author Award
2021 PhD Fellowship: *Contrat doctoral spécifique normalien (CDSN)*

TALKS

A Tropical Day in CMAP, Palaiseau Oct 21, 2024
Eigenvalue Methods for Sparse Tropical Polynomial Systems

Conference ICMS 2024 in Durham Jul 22 – Jul 25, 2024
Eigenvalue Methods for Sparse Tropical Polynomial Systems

Conference ISSAC 2023 in Tromsø Jul 24 – Jul 27, 2023
The Nullstellensatz and Positivstellensatz for Sparse Tropical Polynomial Systems

SIAM Conference on Applied Geometry in Eindhoven Jul 10 – Jul 14, 2023
The Nullstellensatz and Positivstellensatz for Sparse Tropical Polynomial Systems

Rencontres Doctorales Lebesgue 2023 in Nantes Apr 19 – Apr 21, 2023
Un tour d'horizon des mathématiques tropicales

Journées nationales de calcul formel in CIRM, Marseille Mar 6 – Mar 10, 2023
The Nullstellensatz and Positivstellensatz for Sparse Tropical Polynomial Systems

Workshop ARGO 2022 in Santiago Aug 30 – Sept 2, 2022
The Nullstellensatz for Sparse Tropical Polynomial Systems

TEACHING

Mathematics teacher Present
in *seconde*, *première* and *terminale* at Lycée de Cachan

Mathematics examiner Present
in second year of *classe préparatoire TSI* (technology and industrial science) at Lycée de Cachan

Teaching assistant 2021–2024
in first year of Bachelor of Science at École polytechnique for the fall semester course MAA101 Linear Algebra for three years

Mathematics and computer science examiner 2020–2021
in first and second year of *classe préparatoire BCPST* (biology, chemistry, physics and geology) at lycée Chaptal, Paris

Mathematics examiner 2019–2020
in first year of *classe préparatoire PCSI* (physics, chemistry and engineering) at ECAM Rennes

MISCELLANEOUS

- 2022–2023 Referent researcher for the *MATh.en.JEANS* project (a school year long workshop to introduce high school students to mathematical research on open problems) in lycée Gustave Eiffel, Gagny
- 2018, 2021 Juror and team leader for the 10th and 13th editions of the *International Tournament of Young Mathematicians*
- 2018, 2019, 2020 Organiser, juror and team leader for several occurrences of the *Tournoi Français des Jeunes Mathématiciennes et Mathématiciens (TFJM²)*
- 2018 Local organiser for the *Rendez-vous des Jeunes Mathématiciennes* (a weekend of conferences and research on problems to encourage young girls in high schools to engage in mathematical activities)

SKILLS

- Languages French (mother tongue), English (fluent C1-C2), German (good level B2-C1)
- Computer Skills Python, Scilab/Matlab, Lean, OCaml, Html/css, L^AT_EX and Office suite