Postdoctoral researcher
Dipartimento di Matematica Tullio Levi-Civita of the Università di Padova

Date of Birth: September 20, 1996
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Employement / Education

— 2024-Now *Postdoctoral researcher* at the Università di Padova/ Dipartimento di Matematica Tullio Levi-Civita

Supervisors: Fabio Ancona, Roberta Bianchini, Laura Caravenna, Elio Marconi
Project: PRIN Project 2022 PNRR (No. 2022XJ9SX) entitled "Heterogeneity on the road - Modeling, analysis, control"

— 2021-2024 *PhD in Mathematics* at the Université Toulouse 3 Paul Sabatier / Institut de Mathématiques de Toulouse

Advisors: Jean-François Coulombel and Grégory Faye
Title: Stability of discrete shock profiles for systems of conservation laws
Defense: 12th of July, 2024
Referees: Hermen Jan Hupkes, Pauline Lafitte
Jury: Claire Chainais-Hillairet, Frédéric Rousset
Financing: "Contrat Doctoral Spécifique pour Normalien" of the ENS Paris-Saclay

— 2017-2021 *Élève normalien* at ENS Paris-Saclay, Cachan

- **2020-2021** M2 Mathématiques de la Modélisation at Sorbonne Université with highest honors
- **2020** Admitted 29th at the competitive exam of the Agrégation of Mathematics (option B scientific calculus)
- **2019-2020** M2FESup in Mathematics option B, ENS Paris-Saclay, preparation for the Agrégation of Mathematics with highest honors
- **2018-2019** M1 Hadamard, ENS Paris-Saclay (with courses at Université de Paris-Sud and École Polytechnique) with high honors
- **2017-2018** L3 in Mathematics from ENS Paris-Saclay in collaboration with Université Paris-Diderot with high honors
- **2017** Admitted to ENS Paris-Saclay (Competitive exam)

— 2014-2017 MPSI and MP* at Lycée Louis-le-Grand, Paris

— 2014 Scientific Baccalauréat (section Abibac) with highest honors at Lycée Gustave Flaubert, Rouen

Research interests

- Finite difference schemes for the transport equation: Stability, large-time behavior, boundary conditions, GKS theory
- Conservative finite difference schemes for hyperbolic systems of conservation laws: stability of discrete shock profiles via spatial dynamics technique and Green's function analysis
- Traffic flow models

List of (pre)publications

Preprint

- L. Coeuret — **Nonlinear orbital stability of stationary discrete shock profiles for scalar conservation laws**
  (2024), Submitted, pp. 1-49

  HAL: https://hal.science/hal-04712769 arXiv: https://arxiv.org/abs/2409.18930

Publications

- L. Coeuret — **Linear stability of discrete shock profiles for systems of conservation laws**
  Accepté à *Journal of Hyperbolic Differential Equations*, *(2025)*, pp. 1-105

  HAL: https://hal.science/hal-04270648 arXiv: https://arxiv.org/abs/2311.02507

- L. Coeuret — **Local limit theorem for complex valued sequences**
  Asymptotic Analysis, In press, *(2025)*, pp. 1-53

  DOI: https://doi.org/10.1177/09217134241308379 arXiv: https://arxiv.org/abs/2201.01514
  HAL: https://hal.science/hal-03463375

- L. Coeuret — **Tamed stability of finite difference schemes for the transport equation on the half-line**
  Mathematics of Computation, Volume 93, Number 347, *(2024)*, pp. 1097-1151

  DOI: https://doi.org/10.1090/mcom/3901 arXiv: https://arxiv.org/abs/2304.02612
  HAL: https://hal.science/hal-04059973

Proceedings

- L. Coeuret — **Large time behavior of finite difference schemes for the transport equation**
  Hyperbolic Problems: Theory, Numerics, Applications. Volume II. HYP 2022. SEMA SIMAI Springer Series, Vol 35., *(2024)*, pp. 63-71

  DOI: https://doi.org/10.1007/978-3-031-55264-9_6 HAL: https://hal.science/hal-04191971

Thesis

- **Stability of discrete shock profiles for systems of conservation laws**
  Defended on *July 12th 2024*, at the Institut de Mathématiques de Toulouse, Université Toulouse III Paul Sabatier

  HAL: https://theses.hal.science/tel-04652121

Seminars, Conferences and Scientific Schools

(Upcoming) **Summer School on "Population Dynamics: From fundamental to applied science"** 16-27 June 2025, Grasse (France)

(Upcoming) **Workshop: Traffico e Leggi di Conservazione** 5 June 2025, Rome (Italy)

Séminaire EDP et Applications de l'Institut Élie Cartan de Lorraine 25 March 2025, Nancy (France)

Conference on Mathematics of Wave Phenomena 24-28 February 2025, Karlsruhe (Germany)
Presentation of a 25 minutes talk

13th Meeting on Nonlinear Evolution PDEs, Fluid Dynamics and Transport Equations 17-21 February 2025, Triesta (Italia)
Participation in the poster session

Journées Jeunes Edpistes en France 2025 8-10 January 2025, Nice (France)
Presentation of a 25 minutes talk

Seminari Generali dell'IAC 8 October 2024, Roma (Italy)

Summer school in fluid dynamics and nonlinear PDEs 9-13 September, 2024, Padova (Italy)
Attendance

Equadiff 2024 10-14 June 2024, Karlstad (Sweden)
Presentation of a 30 minutes talk

CANUM (Congrès d'Analyse Numérique) 2024 27-31 May 2024, Île de Ré (France)
Presentation of a 30 minutes talk

Séminaire EMA November 23, 2023, Calais (France)

Séminaire d'Analyse Numérique de l'IRMAR 16 November 2023, Rennes (France)

Congrès des Jeunes Chercheurs en Mathématiques et Applications 2023 25-27 September 2023, Gif-sur-Yvette (France)
Presentation of a 20 minutes talk

Numhyp23 : Numerical Methods for Hyperbolic Problems 26-30 June 2023, Bordeaux (France)
Presentation of a 20 minutes talk

Workshop on spatial dynamics and related approaches 5-7 September 2022, Stuttgart (Germany)
Participation in the poster session

XVIII International Conference on Hyperbolic Problems: Theory, Numerics, and Applications 20-24 June 2022, Málaga (Spain)
Presentation of a 20 minutes talk

Teaching

Université Toulouse III - Paul Sabatier

2023-2024

- Functions and calculus 1, L1, TD, first semester, 28H
- Introduction to real analysis, L1, TD/TP, second semester, 32H

2022-2023

- Functions and calculus 1, L1, TD, first semester, 28H
- Linear Algebra 1, L1, TP, first semester, 4H
- Introduction to real analysis, L1, TD/TP, second semester, 32H
- Linear Algebra 1, L1, TP, second semester, 4H

2021-2022

- Numerical methods, L2, TD/TP, first semester, 24H
- Introduction to real analysis, L1, Demi-cours/TD/TP, second semester, 41H

Organizing responsabilities

- **02/2024 - 08/2024** Representative of the PhD Students and Postdoctoral Researchers on the Laboratory Council at the Institut de Mathématiques de Toulouse
- **09/2023 - 08/2024** Organizer of the PDE student seminar at the Institut de Mathématiques de Toulouse

Internships

- **2021 - April / July** Scientific traineeship at Institut de Mathématiques de Toulouse, Université Toulouse 3 Paul Sabatier under the guidance of Jean-François Coulombel and Grégory Faye (4 Months)

- **2019 - April / July** Scientific traineeship at Institut de Mathématiques de Toulouse, Université Toulouse 3 Paul Sabatier: Laurent Operators and Stability of Numerical Schemes, under the guidance of Jean-François Coulombel (4 Months)
- **2018** Scientific traineeship at CMLA, ENS Paris-Saclay: Theoretical and numerical study of an inequality in fluid mechanics with Yasinne El-Kaouni, under the guidance of Laure Quivy (3 Months)
- **2015 - July / August** Linguistic traineeship at Humboldt Universität, Berlin

Languages and Various Information

- German (Abitur with a note of 1.8, Level C1 certification of the Humboldt Universität, Level B2 certification of the Goethe Institut)
- English (Level C2 certification at the Cambridge Advanced Exam)
- Programming skills in Python and LaTeX