Haroun Meghaichi

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Education

Virginia Tech — Blacksburg, VA
Ph.D. in Mathematics (*In progress*), Advisor: Dr. Slimane Adjerid. — 2019–Current

Virginia Tech — Blacksburg, VA
M.S. in Mathematics, GPA: 3.96/4.00 — 2017–2019

University of Science and Technology Houari Boumediene — Algiers, Algeria
B.S. in Mathematics. (Class rank 1) — 2013–2016

- Thesis: "Applications of category theory in science."

Experience

Virginia Tech, Department of Mathematics — Blacksburg, VA
Graduate teaching assistant — Fall 2017-current

- I have worked as a tutor, as teaching assistant, and as an instructor of record.

Excellence Academy — Algiers, Algeria
Mathematics tutor — 2014-2015

- I have worked as a part-time tutor for high school students.

Publications

[1] S. Adjerid, T. Lin, and **H. Meghaichi**. "A unified immersed finite element error analysis for one-dimensional interface problems". In: (Submitted, 2023). arXiv: 2306.10018.

[2] S. Adjerid, T. Lin, and H. Meghaichi. "A high order geometry conforming immersed finite element for elliptic interface problems". In: *Computer Methods in Applied Mechanics and Engineering* (Accepted, 2023).

[3] S. Adjerid, T. Lin, and H. Meghaichi. "An immersed discontinuous Galerkin method for wave propagation in acoustic elastic media". In: *Journal of Computational Physics* 472 (2023).

Research

My research centers on the applications of finite element and dG methods to solve partial differential equations with discontinuous coefficients. Some of the topics that I work on are:

- **Fluid-structure interactions:** We have developed a stable and accurate immersed DG method to simulate the travel of acoustic and elastic waves.

- **Unified analysis for immersed Finite element and dG method:** We have developed a unified framework for the analysis of various immersed FE and dG methods for elliptic, hyperbolic, parabolic and higher order PDEs in one spatial dimension.

- **Higher order geometry informed immersed finite element method:** We are developing higher order methods for interface problems problems on complex interface geometries in two and three spatial dimensions for various PDEs.

Conference talks

1. A high order geometry conforming immersed finite element for elliptic interface problems, the 8th Annual Meeting of SIAM Central States Section, University of Lincoln-Nebraska, 2023.
2. A unified immersed finite element error analysis for one-dimensional interface problems, SIAM Southeastern Atlantic Section Annual Meeting, Virginia Tech, 2023.
3. An immersed discontinuous Galerkin method for wave propagation in acoustic elastic media, 16th U.S. National Congres on Computational Mechanics, online, 2021.
4. An immersed discontinuous Galerkin method for wave propagation in acoustic elastic media, Finite Element Circus, online, 2021.
5. An immersed finite element method for wave propagation in acoustic elastic media, Finite element, Virginia Tech, 2019 .

Scholarships and Awards

- Outstanding graduate teaching assistant award 2020–2021
- US National Congress for Computational Mechanics Conference Award. 2021
- SIAM Student travel award 2023
- Lee R. Steeneck and Regina Aultice Steeneck Graduate Fellowship 2022–2023

Teaching

- **Instructor of record** at Virginia Tech 2018-current
  Operational methods: Summer '20, Fall '20, Spring '21, Summer '21, Fall '21, Spring '22, Summer '22, Fall '22, Summer '23,
  Numerical analysis: Summer '20.
  Linear algebra: Spring '20.
  Multivariable calculus: Summer '19.
  Integral calculus: Spring '18.
  Differential calculus: Fall '18, Fall '19, Summer '21, Summer '22, Summer '23
  Elementary calculus II: Summer '18.
- **Teaching Assistant** at Virginia Tech Summer 2019
  Operational methods for engineers.
- **Lab instructor** at Virginia Tech Spring 2018
  Elementary calculus I.

Skills

- **Programming:** Python, MATLAB, Julia
- **Mathematics software:** Mathematica, Sage, Maple, Geogebra.
- **Other:** Bash, LaTeX, CAD, Photoshop.

Languages

- **English:** Proficient.
- **French:** Proficient.
- **Arabic:** Native.

Extracurricular Activities

- President, SIAM Student Chapter 2018–2020
  As the president of the student chapter, I was responsible for organizing biweekly research seminar by VT graduate students, professors and alumni.
- Senior Graduate Teaching Assistant 2019-Current
  As an SGTA, I am responsible for co-organizing a biweekly seminar on topics ranging from teaching to personal development.
- Volunteer at MORE '19 and MORE '20 2019 and 2020
  As a graduate student participant at MORE, I had the chance to share my research experience with aspiring undergraduate students from different universities.