Romain Mottier

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Education

PhD in Applied Maths - Computational physics - Numerical Analysis 10/2021 – 12/2024
Ecole des Ponts ParisTech & CEA *Paris – France*
Non-conforming hybrid (HDG/HHO) finite elements methods for modeling and numerical simulation of elasto-acoustic wave propagation

University exchange: MSc Numerical Methods in Engineering 09/2020 – 02/2021
Polytechnic University of Catalonia (UPC) *Barcelona – Spain*
Numerical methods studied: Discontinuous Galerkin (DG), eXtended FEM (XFEM), Phase-field models, Meshless methods

MSc in engineering: Modeling and fluid-strucutre computation 09/2018 – 09/2021
SeaTech engineering school, University of Toulon *Toulon – France*
Cross-skills in numerical methods, applied mathematics and mechanics
Methods studied: Finite Volume / Finite Elements / Finite Differences / Monte-Carlo / Newton–Raphson / Runge–Kutta / Continuum Mechanics / Fluid Mechanics

Experiences

Teaching experiences

Supervisor of theoretical and practical work classes 01/2023 – 05/2023
Paris Dauphine University *Paris – France*
Grade: 2nd year of Bachelor's degree in Mathematics and Computer science
Course: Numerical methods (Nonlinear equations, polynomial interpolation, quadrature formulas, iterative and direct methods for solving linear systems, eigenvalues and eigenvectors computing)

Supervisor of theoretical and practical work classes 09/2022 – 12/2022
Paris Sorbonne University Paris - France *Paris – France*
Grade: 1st year of Master's degree in Computational Mechanics
Course: Numerical methods (Linear systems, finite differences, continuum mechanics)

Internships

Research intern 03/2021 – 08/2021
French National Office for Aerospace Studies and Research (ONERA) *Toulouse – France*
Study, implementation and comparison of Spectral Differences (SD) and a Mimetic method (CDO scheme) to solve Maxwell equations in the time domain

Research intern 05/2020 – 08/2020
European Space Agency (ESA) *Nordwijck – Nedetherland*
Numerical modeling of the temperature distribution on the surface and in the depths of Mercury. High-order finite differences scheme in spherical coordinates

Skills

Applied mathematics, numerical analysis and numerical modeling
Implementing numerical methods to perform simulations for problem involve in science and engineering
Programming languages: C/C++, Fortran, Python, Matlab, LaTeX, Git

Research work

Publications

Congress

Hybrid high-order methods for time-dependent, coupled elasto-acoustic wave propagation
World Congress on Computational Mechanics (WCCM) - Vancouver (Canada) - July 2024
European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS) - Lisbon (Portugal) - June 2024
Congress of Young Researchers in Applied Mathematics (CJCMA) - Paris (France) - September 2023

Unfitted HHO method stabilized by polynomial discrete extension
National Congress of Numerical Analysis (CANUM) - Ile de Ré (France) - May 2024

Numerical study of energy transfer in sedimentary basins using high-order methods
American Geophysical Union (AGU) - San Francisco (USA) - December 2023