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↪ RESEARCH INTERESTS & SKILLS

Structure-preserving discretization, mimetic spectral element method, finite element method, numerical analysis, computational fluid dynamics, parallel computing

↪ EXPERIENCE

Teacher November 2023 - present
Discrete geometries of mathematics and physics (dgmp)
Department of Information and Computing Science
School of Mathematics and Computing Science
Guilin University of Electronic Technology, Guilin, China

Post-doctoral researcher November 2022 - November 2023
Robotics and Mechatronics
Faculty of Electrical Engineering, Mathematics & Computer Science
University of Twente, Enschede, the Netherlands

Post-doctoral researcher February 2022 - October 2022
Computational Mechanics
School of Aeronautics and Astronautics
Sun Yat-sen University, Shenzhen, China

↪ EDUCATION

Ph.D. September 2016 - January 2022 (including one gap year)
Aerodynamics
Delft University of Technology, Delft, the Netherlands
Mimetic Spectral Element Method and Extensions toward Higher Computational Efficiency

Master of Science September 2013 - February 2016
Aerodynamics
Delft University of Technology, Delft, the Netherlands
Spatially mass-, kinetic energy- and helicity-preserving mimetic discretization of 3D incompressible Euler flows

Bachelor of Science September 2009 - June 2013
Aircraft Environment and Life-supporting Engineering
Nanjing University of Aeronautics and Astronautics, Nanjing, China

↪ PUBLICATIONS

• Andrea Brugnoli, Ramy Rashad, Yi Zhang, Stefano Stramigioli, Finite element hybridization of port-Hamiltonian systems, arXiv:2302.06239, submitted to Applied Mathematics and Computation, `https://arxiv.org/abs/2309.10373`

• Yi Zhang, Artur Palha, Marc Gerritsma, Qinghe Yao, A MEEVC discretization for two-dimensional incompressible Navier-Stokes equations with general boundary conditions, to appear in Journal of Computational Physics, `https://arxiv.org/abs/2307.08166`

• Zhuolin Wang, Zichao Jiang, Yi Zhang, Gengchao Yang, Trevor Hocksun Kwan, Yuhui Chen, Qinghe Yao, A moving least square immersed boundary method for SPH with thin-walled structures, to appear in Computational Particle Mechanics.

• Zichao Jiang, Zhuolin Wang, Qinghe Yao, Gengchao Yang, Yi Zhang, Junyang Jiang, A neural network-based Poisson solver for fluid simulation, to appear in Neural Processing Letters.

• Qinghe Yao, Zhuolin Wang, Yi Zhang, Zijie Li, Junyang Jiang, Towards real-time fluid dynamics simulation: A data-driven NN-MPS method and its implementation, Mathematical and Computer Modelling of Dynamical Systems 29 (2023) 95-115.

• Y. Zhang, A. Palha, M. Gerritsma and L. G. Rebholz, A mass-, kinetic energy- and helicity-conserving mimetic dual-field discretization for three-dimensional incompressible Navier-Stokes equations, part I: Periodic domains, Journal of Computational Physics 451 (2022) 110868, `doi.org/10.1016/j.jcp.2021.110868`

• Y. Zhang, J. Fisser and M. Gerritsma, A hybrid mimetic spectral element method for three-dimensional linear elasticity problems, Journal of Computational Physics, 433, 110179, (2021), `doi.org/10.1016/j.jcp.2021.110179`

• V. Jain, Y. Zhang, A. Palha and M. Gerritsma, Construction and application of algebraic dual polynomial representations for finite element methods on quadrilateral and hexahedral meshes, Computers & Mathematics with Applications, 95, 101-142, (2021), `doi.org/10.1016/j.camwa.2020.09.022.`

• Y. Zhang, V. Jain, A. Palha, M. Gerritsma, The Use of Dual B-Spline Representations for the Double de Rham Complex of Discrete Differential Forms, Lecture Notes in Computational Science and Engineering 133 (2021) 227-242, `doi.org/10.1007/978-3-030-49836-8_11`

• Y. Zhang, V. Jain, A. Palha, M. Gerritsma, Discrete Equivalence of Adjoint Neumann–Dirichlet div-grad and grad-div Equations in Curvilinear 3D Domains, Lecture Notes in Computational Science and Engineering 134 (2020) 203-213, doi.org/10.1007/978-3-030-39647-3_15

• M. Gerritsma, V. Jain, Y. Zhang, A. Palha, Algebraic Dual Polynomials for the Equivalence of Curl-Curl Problems, Lecture Notes in Computational Science and Engineering 132 (2020), doi.org/10.1007/978-3-030-30705-9_27

• Y. Zhang, V. Jain, A. Palha, M. Gerritsma, The Discrete Steklov–Poincaré Operator Using Algebraic Dual Polynomials, Computational Methods in Applied Mathematics 19(3) (2019) 645-661, doi.org/10.1515/cmam-2018-0208

• Y. Zhang, V. Jain, A. Palha, M. Gerritsma, A high order hybrid mimetic discretization on curvilinear quadrilateral meshes for complex geometries, In proceedings of 6th European Conference on Computational Mechanics & 7th European Conference on Computational Fluid Dynamics (2019) 426-437.

• M. Gerritsma, A. Palha, V. Jain, Y. Zhang, Mimetic Spectral Element Method for Anisotropic Diffusion, Numerical Methods for PDEs. SEMA SIMAI Springer Series 15 (2018) 31-74, doi.org/10.1007/978-3-319-94676-4_3

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