

artur palha, phd

Lichtstraat 81
5611XB Eindhoven, The Netherlands
☎ 0031.639.125.130
✉ a.palha@tudelft.nl
🌐 www.palha.org

Summary

I am a scientific software developer with a background in applied mathematics and physics, and more than 14 years experience in the development, implementation, and application of numerical discretizations for computational fluid dynamics (CFD) problems. I have a diverse work experience, having worked at academic institutions, contract driven applied research institutes, and industry. This provides me with a strong technical background and a good understanding of different work contexts and their interaction.

Scientific Work Experience

2017–present **Scientific Software Developer**, *Algorithms and Physics Modelling group, ASML*, Eindhoven, The Netherlands.

Development, integration, deployment, and analysis of scientific computational kernels for modelling electromagnetic wave scattering for optical metrology.

- Continuous algorithm development and improvement of (two) in-house numerical simulation solvers for electromagnetic wave scattering (for machine simulation and measurement algorithms).
- Implementation (coding) of computational kernels (C++, Fortran, Python, Matlab) and version management control (git).
- Uncertainty quantification (Hamiltonian Monte-Carlo techniques).
- Big data analysis.
- Liaison between computational kernel development and software integration teams.
- Technical support and training (KT sessions) on computational simulation and modelling tool.
- Co-inventor of a patent.

2008–present **Researcher**, *Delft University of Technology, Aerodynamics, Wind Energy, Flight Performance and Propulsion*, Delft, The Netherlands.

Development of novel structure preserving (conservative) numerical discretization techniques on flexible meshes for computational fluid dynamics (CFD).

- High order structure preserving discretizations, hybrid finite element discretizations, Hamiltonian variational approaches for coupling multiphysics.
- Wide range of applications in CFD: general CFD (*4 journal publications*), atmospheric geophysical flows including shallow waters (*4 journal publications*), free surface flows (*2 journal publications*), reservoir modelling (*2 journal publications*).
- Extensive experience with finite elements, finite volumes, boundary elements, and their coupling.
- Implementation of efficient and scalable (non)linear solvers for CFD.
- Supervision of 3 PhD candidates (*2 ongoing*) and 13 M.Sc. students.
- Organizer of 4 minisymposia (*1 in preparation for interaction between structure preserving discretization developers and operational meteorological institutes*).
- Collaborations with Monash University (Australia), Bureau of Meteorology (Australia), Max Planck Institute (Germany), Sandia National Labs (USA).
- Detailed information on research topics see the publication list (*30+ manuscripts*).

2014–2018 **Researcher**, *Eindhoven University of Technology, Control Systems and Technology*, Eindhoven, The Netherlands.

Development of a physical model and numerical discretization techniques for a plasma fusion reactor aiming for real time control purposes. Joint research with EPFL (Switzerland) and DIFFER (The Netherlands).

- Multiphysics free boundary problem.
- Nonlinear solvers (Jacobian-free Newton-Krylov methods).
- Supervision of 2 B.Sc. students.

2006–2007 **Research fellow**, *National Laboratory of Civil Engineering (LNEC)*, Lisbon, Portugal.

Free surface flows in coastal areas: numerical modelling, physical (scale) modelling, and data analysis.

- Development of a methodology for simulation of wave energy devices and their impact on the shoreline wave climate (*one highly cited journal publication with 94 citations*).
- Development of a predictive real-time warning system for waves inside harbours pyMOIA (*prize*).
- Free surface wave simulation in coastal areas in the context of contract/research project work.

2002–2003 **Junior Research fellow**, *European Organization for Nuclear Research (CERN) / Center for Fundamental Physics Interactions (CFIF)*, Geneva, Switzerland and Lisbon, Portugal.

Numerical simulation and data acquisition system interface programming for the NA60 experiment.

Education

2015 **BKO**, *Technische Universiteit Delft*, Delft, The Netherlands.

Basis Kwalificatie Onderwijs – Qualification for teaching in Dutch Higher Education system (160 hours)

2008–2013 **Ph.D.**, *Technische Universiteit Delft*, Delft, The Netherlands.

Numerical analysis and scientific computing

title: *High order mimetic discretization: Development and application to Laplace and convection-diffusion problems in arbitrary quadrilaterals*

date: 3 Sept. 2013

promotors: Dr.ir. Marc Gerritsma and Prof.dr.ir.drs. Hester Bijl

description: Development of an arbitrary order finite element structure preserving numerical scheme for solving PDEs, incorporating concepts from differential geometry and algebraic topology that exactly satisfy fundamental mathematical relations at the discrete level even on flexible meshes. This lead to faster, more robust, and accurate numerical discretizations for computational fluid dynamics. Development of arbitrary order mimetic time integrators for ODEs.

2004 **Licenciatura in Applied Physics**, *Instituto Superior Técnico, Universidade de Lisboa*, Lisbon, Portugal, grade: 17 (out of 20).

thesis: *Development of a computational model for a PEM fuel cell*

advisors: Dr.eng. António Joyce and Prof.dr.eng. Manuel Collares-Pereira

Publication highlights

16. *A mass-, kinetic energy-, and helicity-conserving mimetic dual-field discretization for three dimensional incompressible Navier-Stokes equations: Part I, periodic domains*, Y. Zhang, A. Palha, M. Gerritsma. Submitted *Journal of Computational Physics* (2021).

15. *A conservative, physically compatible discretization for turbidity currents*, G. de Diego, [A. Palha](#), M. Gerritsma. Submitted *Journal of Computational Physics* (2020). arXiv:1910.05978
14. *Exact spatial and temporal balance of energy exchanges within a horizontally explicit/vertically implicit non-hydrostatic atmosphere*, D. Lee, [A. Palha](#). Submitted *Journal of Computational Physics* (2020). arXiv:2011.07861
13. *A mixed mimetic spectral element model of the 3D compressible Euler equations on the cubed sphere*, D. Lee, [A. Palha](#). *Journal of Computational Physics*, 401, (2020).
12. *A mixed mimetic spectral element model of the rotating shallow water equations on the cubed sphere*, D. Lee, [A. Palha](#). *Journal of Computational Physics*, 375, pp. 240-262 (2018).
11. *Discrete conservation properties for shallow water flows using mixed mimetic spectral elements*, D. Lee, [A. Palha](#), M. Gerritsma. *Journal of Computational Physics* 357, pp. 282-304 (2018).
10. *Mimetic spectral element method for anisotropic diffusion*, M. Gerritsma, [A. Palha](#), V. Jain, Y. Zhang, chapter of *Numerical Methods for PDEs*, pp. 31-74, SEMA SIMAI Springer Series (2018).
9. *A mass, energy, enstrophy and vorticity conserving (MEEVC) mimetic spectral element discretization for the 2D incompressible Navier-Stokes equations*, [A. Palha](#), M. Gerritsma. *Journal of Computational Physics*, 328, pp. 200-220 (2017).
8. *Physics-compatible discretization techniques on single and dual grids, with application to the Poisson equation of volume forms*, [A. Palha](#), P.P. Rebelo, R. Hiemstra, J. Kreeft, M. Gerritsma. *Journal of Computational Physics* (special issue on Physics-compatible numerical methods), 257(PB), pp. 1394-1422 (2014).
7. *The impact of wave energy farms in the shoreline wave climate: Portuguese pilot zone case study using Pelamis energy wave devices*, [A. Palha](#), L. Mendes, C. J. Fortes, A. Brito-Melo, A. Sarmiento. *Renewable Energy*, 35(1), pp. 62-77 (2010).
6. *Irregular wave propagation at Torres-Mostardas beach, Brazil*, [A. Palha](#), C.J. Fortes, P.R.F. Teixeira, L.V. Pinheiro. *Maritime Engineering*, 163(MA2), pp. 57-71 (2010).
5. *An artificial surfing reef in Sao Pedro do Estoril beach, Portugal. Numerical and physical modeling studies*, C.J. Fortes, M.G. Neves, A. Mendonca, [A. Palha](#). *Coastal Engineering* 2008, Vol. 1-5, pp. 255-267 (2009).
4. *A methodology for the analysis of physical model scale effects on the simulation of wave propagation up to wave breaking: preliminary physical model results*, C.J. Fortes, M. Graca, J.A. Santos, [A. Palha](#). *Proceedings of the 27th international conference on offshore mechanics and arctic engineering*, Vol. 4, pp. 571-578 (2008).
3. *Analysis of the impact of a pilot zone for wave energy conversion offshore Portugal*, L. Mendes, [A. Palha](#), C.J. Fortes. *International offshore and polar engineering conference proceedings*, Vol. 1, pp. 401-409, (2008).
2. *Internal wave generation on finite element model BOUSM_iw: comparison with experimental data*, L. Pinheiro, [A. Palha](#), C.J. Fortes. *Proceedings of the 17th (2007) International offshore and polar engineering conference*, Vol. 1-4, pp. 2309-2316 (2007).
1. *Numerical simulation of random wave runup on seawall near shoreline*, [A. Palha](#), C.J. Fortes, H. Mase. *Proceedings of the 17th (2007) International offshore and polar engineering conference*, Vol. 1-4, pp. 2647-2654 (2007).

Citation scores and profiles

Scopus **link:** <https://www.scopus.com/authid/detail.uri?authorId=23012717800>
h index: 9;
citations: 301;
indexed documents: 38;

G. Scholar **link:** <https://scholar.google.pt/citations?user=8jjaYakAAAAJ&hl=en>
h index: 13;
citations: 608;
indexed documents: 65;

Awards and grants

- 2014 **Research grant**, *Shell-NWO-FOM*, The Netherlands, co-author of application. Affordable high resolution reservoir modeling using a multiscale approach (256k€)
- 2008 **Research grant**, *Foundation for Science and Technology*, Portugal, main author of application. High order mimetic discretization (100k€)
- 2007 **Adolpho Loureiro prize**, *Portuguese delegation of the International Association for Navigation (PIANC)*, Portugal.
pyMOIA – real-time prediction of wave state in harbours

Service (highlights)

1. Co-organizer of two mini-symposia *Structure Preserving Discretizations I and II*, ENUMATH 2019, the Netherlands (2019).
2. Developer of mimeticFEM library for solving PDEs using the mimetic arbitrary order finite element formulation (<https://github.com/apalha/mimeticFEM>).
4. Developer of pHyFlow hybrid Eulerian-Lagrangian flow solver for wind energy applications (<https://github.com/apalha/pHyFlow2.0>).
5. Reviewer for *Journal of Computational Physics* (12x), *Computers & Mathematics with Applications* (3x), *Advanced Modeling and Simulation in Engineering Sciences*, *Applied Energy* (1x), *Flow Turbulence and Combustion* (1x), and *ICNAAM 2014* (1x), *Applied Mathematics and Computation* (1x), *Computational Methods in Applied Mathematics* (1x).

Invited talks

12. *A mass-, kinetic energy- and helicity-conserving mimetic spectral element discretization for 3D incompressible Navier-Stokes equations*, SIAM CSE, Fort Worth, Texas, USA (2021).
11. *Structure Preserving Finite Element Discretizations*, Max-Planck Institute for Plasma Physics - Division of Numerical Methods for Plasma Physics, Garching, Germany (2020).
10. *Structure Preserving Finite Element Discretizations and Variational Discretizations*, Fields Institute, Toronto, Canada (2019).
9. *Efficient mimetic discretizations with algebraic dual polynomials*, Canadian Mathematical Society Winter meeting, Vancouver, Canada (2018).
8. *Hybrid mimetic discretizations*, Université Franche-Compte, Besançon, France (2018).
7. *High order mimetic discretizations for flow problems*, High order discretizations, Danish Society for Industrial Fluid Dynamics (DANSIS), Denmark (2018).

6. *High order mimetic discretizations*, Connections in Geometric Numerical Integration and Structure-Preserving Discretization, Banff International Research Station (BIRS), Canada (2017). (see palha.org for video).
5. *Spectral mimetic least-squares method for curl-curl systems*, Large Scale Scientific Computing (LSSC), Bulgaria (2017).
4. *High order mimetic discretizations*, Canadian Mathematical Society Winter meeting, Niagara Falls, Canada (2016).
3. *Helicity- and Energy-conserving discretization for the 3D Euler equations*, ENUMATH, Ankara, Turkey (2015).
2. *Mass, Energy, Enstrophy and Vorticity conserving mimetic spectral element inviscid flow solver*, WCCM-ECCM-ECFD, Barcelona, Spain (2014).
1. *Physically accurate advection with the discrete representation of the Lie derivative*, Conference in Finite elements for flow problems (FEF2011), Munich, Germany (2011).

International experience

- 2020 Germany, IPP, Max Planck Institute, Prof.dr. E. Sonnendrücker (2 days visit)/
- 2019 Canada, Fields Institute, Dr. A. Bihlo, Dr. S. MacLachlan, Dr. J. Behrens, Dr. Werner Bauer (5 days visit).
- 2018 Canada, Canadian Mathematical Society, Dr. A. Wan, Dr. A. Bihlo (5 days visit).
- 2018 France, Université Franche-Compte, Prof.dr. A. Lozinski (1 day visit).
- 2018 Denmark, Aarhus University/DANSIS, Dr. B. Gervang (3 days visit).
- 2017 Canada, Banff International Research Station (BIRS), Prof.dr. S. Steinberg, Dr. J.-C. Nave, Dr. A. Wan, Dr. A. Bihlo (5 days visit).
- 2016 Canada, Canadian Mathematical Society, Dr. A. Wan, Dr. A. Bihlo (4 days visit).
- 2016 Switzerland, EPFL, Dr. O. Sauter (1 week visit).
- 2015 Germany, IPP, Prof.dr. E. Sonnendrücker and Dr. M. Kraus (2 weeks visit).
- 2014 Switzerland, EPFL, Dr. O. Sauter (1 week visit).
- 2012 USA, Sandia National Laboratories, Dr. M. Barone (1 week visit).
- 2002 Switzerland, CERN, Prof.dr. J. Seixas (2 months visit)

Teaching

Eindhoven University of Technology

- 2015-2017 Control and Operation of Tokamaks (with dr.ir. F. Felici)

Delft University of Technology

- 2013–2015 Computational Fluid Dynamics I, M.Sc. course (with dr.ir. M.I. Gerritsma)
- 2013–2014 Design Synthesis Exercise, B.Sc. course (winning team)
- 2012–2013 Rotor Aerodynamics, M.Sc. course (with dr.ir. C.S. Ferreira)
- 2010–2011 Design Synthesis Exercise, B.Sc. course
- 2010–2011 Aerodynamics II, B.Sc. course (with prof.dr.ir. F. Scarano)

Supervision

Eindhoven University of Technology

B.Sc.

- 2015 Derks, M., *A spectral element solver for the Grad-Shafranov equation*
- 2015 Duys, A., *A Mesh-free magnetic field solver*
- Delft University of Technology*
- Ph.D.**
- 2016- Varun, J., *Affordable high resolution reservoir modeling using a multiscale approach* (ongoing)
- 2016- Zhang, Y., *Structure-preserving discretization for the Navier-Stokes equation*
- 2015-2017 Baptista, C., *Development of a hybrid Eulerian/Lagrangian flow solver for wind turbines*
- M.Sc.**
- 2018 Wijland, R., *Extension of MEEVC formulation to 3D* (ongoing)
- 2017 Dieben, V., *Isogeometric pressure reconstruction from PIV data*
- 2017 Tamayo-Avenda, J.M., *Coupling of a finite volume solver to a hybrid Lagrangian-Eulerian vortex particle code*
- 2017 de Diego, G. G., *Modelling of depositional pattern of turbidity currents*
- 2015 Zhang, Y., *An energy and helicity conserving mimetic spectral element Navier-Stokes solver*
- 2014 Egilsson, B., *Hybrid vortex models in 2D: Arbitrary moving bodies*
- 2014 Manickathan, L., *A Hybrid Eulerian/Lagrangian numerical method for the study of vertical axis wind turbines in 2D*
- 2012 He, C., *Investigation of the wake of vertical axis wind turbines*
- 2012 Hermidas, N., *Error analysis of high order mimetic spectral element method*
- 2012 Toshniwal, D., *A Geometric Approach Towards Momentum Conservation*
- 2011 Rebelo, P., *Mimetic spectral element method for hyperbolic problems*
- 2010 Lantsheer, M., *Tracking free surface flows using the least-squares spectral element method*
- 2010 Bouman, M.P., *Mimetic spectral element method for elliptic problems*

Full list of publications

Submitted articles

3. *A mass-, kinetic energy-, and helicity-conserving mimetic dual-field discretization for three dimensional incompressible Navier-Stokes equations: Part I, periodic domains*, Y. Zhang, A. Palha, M. Gerritsma. Submitted *Journal of Computational Physics* (2021).
2. *A conservative, physically compatible discretization for turbidity currents*, G. de Diego, A. Palha, M. Gerritsma. Submitted *Journal of Computational Physics* (2020). arXiv:1910.05978
1. *Exact spatial and temporal balance of energy exchanges within a horizontally explicit/vertically implicit non-hydrostatic atmosphere*, D. Lee, A. Palha. Submitted *Journal of Computational Physics* (2020). arXiv:2011.07861

Journal articles

14. *Construction and application of algebraic dual polynomial representations for finite element methods on quadrilateral and hexahedral meshes*, V. Jain, Y. Zhang, A. Palha, M. Gerritsma. accepted *Computational Methods in Applied Mathematics* (2020). arXiv:1712.09472

13. *A mixed mimetic spectral element model of the 3D compressible Euler equations on the cubed sphere*, D. Lee, [A. Palha](#). *Journal of Computational Physics*, 401, (2020).
12. *The discrete Steklov-Poincaré operator using algebraic dual polynomials*, Y. Zhang, V. Jain, [A. Palha](#), M. Gerritsma. *Computational Methods in Applied Mathematics*, 19(3), pp. 645-661 (2019).
11. *Inclusion of no-slip boundary conditions in the MEEVC scheme*, G.G. de Diego, [A. Palha](#), M. Gerritsma. *Journal of Computational Physics*, 378, pp. 615-633 (2019).
10. *Physics research on the TCV tokamak facility: From conventional to alternative scenarios and beyond*, S. Coda, (...), [A. Palha](#). *Nuclear Fusion*, 59(11) (2019).
9. *Dependence on plasma shape and plasma fueling for small edge-localized mode regimes in TCV and ASDEX Upgrade*, B. Labit, (...), [A. Palha](#). *Nuclear Fusion*, 59(8) (2019).
8. *A mixed mimetic spectral element model of the rotating shallow water equations on the cubed sphere*, D. Lee, [A. Palha](#). *Journal of Computational Physics*, 375, pp. 240-262 (2018).
7. *Discrete conservation properties for shallow water flows using mixed mimetic spectral elements*, D. Lee, [A. Palha](#), M. Gerritsma. *Journal of Computational Physics* 357, pp. 282-304 (2018).
6. *A mass, energy, enstrophy and vorticity conserving (MEEVC) mimetic spectral element discretization for the 2D incompressible Navier-Stokes equations*, [A. Palha](#), M. Gerritsma. *Journal of Computational Physics*, 328, pp. 200-220 (2017).
5. *A mimetic spectral element solver for the Grad-Shafranov equation*, [A. Palha](#), B. Koren, F. Felici. *Journal of Computational Physics* (invitation only special issue on Numerical methods for energy), 316, pp. 63-93 (2016).
4. *A posteriori uncertainty quantification of PIV-based pressure data*, I. Azijli, A. Sciacchitano, D. Ragni, [A. Palha](#), R. P. Dwight. *Experiments in Fluids*, 57(5) (2016).
3. *Physics-compatible discretization techniques on single and dual grids, with application to the Poisson equation of volume forms*, [A. Palha](#), P.P. Rebelo, R. Hiemstra, J. Kreeft, M. Gerritsma. *Journal of Computational Physics* (special issue on Physics-compatible numerical methods), 257(PB), pp. 1394-1422 (2014).
2. *The impact of wave energy farms in the shoreline wave climate: Portuguese pilot zone case study using Pelamis energy wave devices*, [A. Palha](#), L. Mendes, C. J. Fortes, A. Brito-Melo, A. Sarmento. *Renewable Energy*, 35(1), pp. 62-77 (2010).
1. *Irregular wave propagation at Torres-Mostardas beach, Brazil*, [A. Palha](#), C.J. Fortes, P.R.F. Teixeira, L.V. Pinheiro. *Maritime Engineering*, 163(MA2), pp. 57-71 (2010).

Book chapters (peer reviewed)

15. *The Use of Dual B-Spline Representations for the Double de Rham Complex of Discrete Differential Forms*, Y. Zhang, V. Jain, [A. Palha](#), M. Gerritsma, . *IGAA 2018: Isogeometric Analysis and Application 2018, Lecture Notes in Computational Science and Engineering*, pp. 227-242 (2021).

14. *Algebraic Dual Polynomials for the Equivalence of Curl-Curl Problems*, M. Gerritsma, V. Jain, Y. Zhang, [A. Palha](#). *Lecture Notes in Computational Science and Engineering*, 132, pp. 307-320 (2020).
13. *Discrete equivalence of adjoint Neumann-Dirichlet div-grad and grad-div equations in curvilinear 3D domains*, Y. Zhang, V. Jain, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, 134, pp. 203-2013 (2020).
12. *A conservative hybrid method for Darcy flow*, V. Jain, J. Fisser, Y. Zhang, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, 134, pp. 215-227 (2019).
11. ***Mimetic spectral element method for anisotropic diffusion***, M. Gerritsma, [A. Palha](#), V. Jain, Y. Zhang, chapter of *Numerical Methods for PDEs*, pp. 31-74, SEMA SIMAI Springer Series (2018).
10. *Spectral mimetic least-squares method for curl-curl systems*, [A. Palha](#), M. Gerritsma *Lecture Notes in Computer Science*, Vol. 10665 LNCS, pp. 119-127 (2018).
9. *Spectral mimetic least-squares method for div-curl systems*, M. Gerritsma, [A. Palha](#), *Lecture Notes in Computer Science*, Vol. 10665 LNCS, pp. 103-110 (2018).
8. *Mimetic Spectral Element Advection*, [A. Palha](#), P.R. Rebelo, M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, Vol. 95, pp. 325-335 (2014).
7. *The Geometric Basis of Numerical Methods*, M. Gerritsma, R. Hiemstra, J. Kreeft, [A. Palha](#), P. Rebelo, D. Toshniwal. *Lecture Notes in Computational Science and Engineering*, Vol. 95, pp. 17-35 (2014).
6. *Mixed Mimetic Spectral Element Method Applied to Darcy's Problem*, P. Rebelo, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, Vol. 95, pp. 17-35 (2014).
5. *Spectral element approximation of the Hodge- \star operator in curved elements*, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, Vol. 76, pp. 283-291 (2011).
4. *A conservative spectral element method for curvilinear domains*, M. Bouman, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computational Science and Engineering*, Vol. 76, pp. 111-119 (2011).
3. *Composite modelling*, H. Gerritsen, J. Sutherland, J. A. Santos, H. van den Boogaard, S. Caires, R. Deigaard, M. Dixen, C. J. Fortes, J. Fredsoe, P. Freire, M. van Gent, X. Gironella, J. Grune, N. Grunnet, P. M. Jensen, R. Lemos, M. G. Neves, C. Obhrai, F. Oliveira, T. Oliveira, H. Oumeraci, [A. Palha](#), L. Pinheiro, R. Schmidt-Koppenhagen, U. Schmidtke, M. T. Reis, M. M. Rita, F. Sancho, J.-P. Sierra, I. Sousa, B. M. Sumer. *Users Guide to Physical Modelling and Experimentation*, CRC Press (2011).
2. *Mimetic Least-Squares spectral/hp finite element method for the Poisson equation*, [A. Palha](#), M. Gerritsma. *Lecture Notes in Computer Science*, Vol. 5910, pp. 662-670 (2010).
1. *Least-Squares spectral element method on a staggered grid*, M. Gerritsma, M. Bouman, [A. Palha](#). *Lecture Notes in Computer Science*, Vol. 5910, pp. 653-661 (2010).

Conference papers

7. *A high order hybrid mimetic discretization on curvilinear quadrilateral meshes for complex geometries*, Y. Zhang, V. Jain, [A. Palha](#), M. Gerritsma. *Proceedings of the 6th European Conference on Computational Mechanics: Solids, Structures and Coupled Problems, ECCM 2018 and 7th European Conference on Computational Fluid Dynamics, ECFD 2018*, pp. 426-437 (2020).
6. *Generalized convection-diffusion through the discrete representation of the Lie derivative*, P. Rebelo, [A. Palha](#), M. Gerritsma. *ECCOMAS 2012 – European Congress on Computational Methods in Applied Sciences and Engineering*, pp. 3457-2476 (2012).
5. *An artificial surfing reef in Sao Pedro do Estoril beach, Portugal. Numerical and physical modeling studies*, C.J. Fortes, M.G. Neves, A. Mendonca, [A. Palha](#). *Coastal Engineering 2008*, Vol. 1-5, pp. 255-267 (2009).
4. *A methodology for the analysis of physical model scale effects on the simulation of wave propagation up to wave breaking: preliminary physical model results*, C.J. Fortes, M. Graca, J.A. Santos, [A. Palha](#). *Proceedings of the 27th international conference on offshore mechanics and arctic engineering*, Vol. 4, pp. 571-578 (2008).
3. *Analysis of the impact of a pilot zone for wave energy conversion offshore Portugal*, L. Mendes, [A. Palha](#), C.J. Fortes. *International offshore and polar engineering conference proceedings*, Vol. 1, pp. 401-409, (2008).
2. *Internal wave generation on finite element model BOUSM_iw: comparison with experimental data*, L. Pinheiro, [A. Palha](#), C.J. Fortes. *Proceedings of the 17th (2007) International offshore and polar engineering conference*, Vol. 1-4, pp. 2309-2316 (2007).
1. *Numerical simulation of random wave runup on seawall near shoreline*, [A. Palha](#), C.J. Fortes, H. Mase. *Proceedings of the 17th (2007) International offshore and polar engineering conference*, Vol. 1-4, pp. 2647-2654 (2007).

Preprints

3. *A hybrid Eulerian-Lagrangian flow solver*, [A. Palha](#), L. Manickathan, C.S. Ferreira, G. van Bussel. *arXiv* (2016).
Citations: 10 (G. Scholar)
2. *Mimetic spectral element method for Hamiltonian systems*, [A. Palha](#), M. Gerritsma. *arXiv* (2015).
Citations: 2 (G. Scholar)
1. *Mimetic framework on curvilinear quadrilaterals of arbitrary order*, J. Kreeft, [A. Palha](#), M. Gerritsma. *arXiv* (2011).
Citations: 57 (G. Scholar)