Francesco Mezzadri

Curriculum Vitae

Principali linee di ricerca

- Analisi di problemi di complementarità lineare ed absolute value equations. Sviluppo di nuovi metodi numerici di soluzione.
- Sviluppo di reti neurali per problemi differenziali.
- Ottimizzazione topologica e di forma.

Incarichi ed attività

2025 – presente **Professore Associato, SSD MATH-05/A**, *Università di Modena e Reggio Emilia.*

2022 – 2025 **Ricercatore a t.d. tipologia B, SSD MATH-05/A**, *Università di Modena e Reggio Emilia.*

2018 – 2022 **Assegnista di Ricerca, SSD MATH-05/A**, *Università di Modena e Reggio Emilia.*

2017 **Research Associate**, *University of Wisconsin-Madison, Madison (WI), U.S.A.*

2015 **Honorary Associate/Fellow (Visiting Scholar)**, *University of Wisconsin-Madison, Madison (WI), U.S.A.*

2014 – 2016 **Dottorato di Ricerca in Analisi Numerica**, *Scuola di Dottorato in Ingegneria Industriale e del Territorio "Enzo Ferrari", Università di Modena e Reggio Emilia.* , **Titolo tesi:** *Iterative methods for nonlinear diffusion problems*, **Advisor:** Prof. E. Galligani.

Pubblicazioni

[1] F. Mezzadri. Fractional absolute value equations. *Opt. Lett.*, pages 1–21, 2026.

[2] N. Ferro, F. Mezzadri, D. Carbonaro, E. Galligani, D. Gallo, U. Morbiducci, C. Chiastra, and S. Perotto. Designing novel vascular stents with enhanced mechanical behavior through topology optimization of existing devices. *Finite Elements in Analysis and Design*, 244:104304, 2025.

[3] F. Mezzadri. A modulus-based framework for weighted horizontal linear complementarity problems. *Appl. Math. Comp.*, 495:129313, 2025.

✉ *francesco.mezzadri@unimore.it*

[4] F. Mezzadri and E. Galligani. Modulus-based matrix splitting algorithms for generalized complex-valued horizontal linear complementarity problems. *J. Comput. Appl. Math.*, 460:116440, 2025.

[5] D. Carbonaro, N. Ferro, F. Mezzadri, D. Gallo, A.L. Audenino, S. Perotto, U. Morbiducci, and C. Chiastra. Easy-to-use formulations based on the homogenization theory for vascular stent design and mechanical characterization. *Comput. Methods Programs Biomed.*, 257:108467, 2024.

[6] X. Zhao, F. Mezzadri, T. Wang, and X. Qian. Physics-informed neural network based topology optimization through continuous adjoint. *Struct. Multidisc. Optim.*, 67(143):1–25, 2024.

[7] D. Carbonaro, F. Mezzadri, N. Ferro, G. De Nisco, A. L. Audenino, D. Gallo, C. Chiastra, U. Morbiducci, and S. Perotto. Design of innovative self-expandable femoral stents using inverse homogenization topology optimization. *Computer Methods in Applied Mechanics and Engineering*, 416:116288, 2023.

[8] F. Mezzadri, J. Gasick, and X. Qian. A framework for physics-informed deep learning over freeform domains. *CAD Computer Aided Design*, 160(103520), 2023.

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[10] F. Mezzadri and E. Galligani. A generalization of the equivalence relations between modulus-based and projected splitting methods. *Ann. Univ. Ferrara*, 68(2):417–439, 2022.

[11] F. Mezzadri and E. Galligani. Projected splitting methods for vertical linear complementarity problems. *J. Optim. Theory Appl.*, 193(1-3):598–620, 2022.

[12] F. Mezzadri and X. Qian. Density gradient-based adaptive refinement of analysis mesh for efficient multiresolution topology optimization. *Int. J. Numer. Meth. Eng.*, 132(2):465–504, 2022.

[13] F. Mezzadri and E. Galligani. A generalization of irreducibility and diagonal dominance with applications to horizontal and vertical linear complementarity problems. *Linear Algebra Appl.*, 621:214–234, 2021.

[14] F. Mezzadri and E. Galligani. Modulus-based matrix splitting methods for a class of horizontal nonlinear complementarity problems. *Numer. Algorithms*, 87:667–687, 2021.

[15] F. Mezzadri and E. Galligani. A modulus-based nonsmooth Newton's method for solving horizontal linear complementarity problems. *Optim. Lett.*, 15:1785–1798, 2021.

[16] F. Mezzadri. Modulus-based synchronous multisplitting methods for solving horizontal linear complementarity problems on parallel computers. *Numer. Linear Algebra Appl.*, 27:e2319, 2020.

[17] F. Mezzadri. On the solution of general absolute value equations. *Appl Math. Lett.*, 107:106462, 2020.

✉ *francesco.mezzadri@unimore.it*

[18] F. Mezzadri and E. Galligani. Modulus-based matrix splitting methods for horizontal linear complementarity problems. *Numer. Algorithms*, 83:201–219, 2020.

[19] F. Mezzadri and E. Galligani. On the convergence of modulus-based matrix splitting methods for horizontal linear complementarity problems in hydrodynamic lubrication. *Math. Comput. Simulation*, 176:226–242, 2020.

[20] F. Mezzadri and X. Qian. A second-order measure of boundary oscillations for overhang control in topology optimization. *J. Comput. Phys.*, 410:1–32, 2020.

[21] F. Mezzadri. On the equivalence between some projected and modulus-based splitting methods for linear complementarity problems. *Calcolo*, 56(41):1–20, 2019.

[22] F. Mezzadri and E. Galligani. A nonlinearity lagging method for non-steady diffusion equations with nonlinear convection terms. *Adv. Comput. Math.*, 45:1185–1220, 2019.

[23] F. Mezzadri and E. Galligani. Splitting methods for a class of horizontal linear complementarity problems. *J. Optim. Theory Appl.*, 180:500–517, 2019.

[24] F. Mezzadri, V. Bouriakov, and X. Qian. Topology optimization of self-supporting support structures for additive manufacturing. *Addit. Manuf.*, 21:666–682, 2018.

[25] F. Mezzadri and E. Galligani. An inexact Newton method for solving complementarity problems in hydrodynamic lubrication. *Calcolo*, 55(1), 2018.

[26] F. Mezzadri and E. Galligani. A Lagged Diffusivity Method for reaction-diffusion-convection equations with Dirichlet boundary conditions. *Appl. Numer. Math.*, 123:300–319, 2018.

[27] F. Mezzadri and E. Galligani. On the Lagged Diffusivity Method for the solution of nonlinear finite difference systems. *Algorithms*, 10(88), 2017.

[28] F. Mezzadri and E. Galligani. A Chebyshev technique for the solution of optimal control problems with nonlinear programming methods. *Math. Comput. Simulation*, 121:95–108, 2016.

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✉ *francesco.mezzadri@unimore.it*