Davide Pradovera

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Born: October 9, 1993—Piacenza, Italy.
Nationality: Italian.

Current position

Post-doctoral researcher, CSQI, EPFL, Lausanne.

Areas of specialization

Numerical mathematics for partial differential equations, approximation theory, model order reduction, frequency-domain applications, scattering problems.

Appointments held

2014–2017 [*Special courses teacher*, Piacenza (I).
2016 [*Developer intern*, Iren S.p.A., Piacenza (I).
2017–2021 [*Doctoral assistant*, EPFL, Lausanne (CH).
2022–now [*Post-doctoral researcher*, EPFL, Lausanne (CH).

Education

2012–2015 [*B.Sc. in Applied Mathematics* (*cum laude*), Politecnico di Milano, Milan (I).
Thesis: "A mathematical justification of the momentum operator in quantum mechanics".
Advisor: Prof. M. Verri.

2015–2017 [*M.Sc. in Computational Science and Engineering*, EPFL, Lausanne (CH).
Project: "Implementation of smooth contact mechanics with the mortar method".
Advisor: Prof. G. Anciaux.
Project: "Finite elements-based Padé approximants for Helmholtz frequency response problems".
Advisor: Prof. F. Nobile.
Thesis: "Randomized low-rank approximation of matrices and tensors".
Advisor: Prof. D. Kressner.

2017–2021 [*Ph.D. in Mathematics*, EPFL, Lausanne (CH).
Thesis: "Model order reduction based on functional rational approximants for parametric PDEs with meromorphic structure".
Advisor: Prof. F. Nobile.

Grants, honors, and awards

2011 [3rd place at the "Hong Kong International Science Fair".
2013 [4th place in the "Championnat International des Jeux Mathématiques et Logiques".
2014 [5th place in the "Championnat International des Jeux Mathématiques et Logiques".
2017 [Douchet prize for best GPA, MATH-EPFL.
2021 [Junior Research Fellowship at ESI Vienna.

Publications and talks

Journal articles

2019 [F. Bonizzoni and DP, "Distributed sampling for rational approximation of the acoustic scattering of an airfoil", PAMM 19.
2020 [F. Bonizzoni, F. Nobile, I. Perugia, and DP, "Fast Least-Squares Padé approximation of problems with normal operators and meromorphic structure", Math. Comput. 89.
F. Bonizzoni, F. Nobile, I. Perugia, and DP, "Least-Squares Padé approximation of parametric and stochastic Helmholtz maps", Adv. Comput. Math. 46.
⌊ DP, "Interpolatory minimal rational model order reduction of parametric problems lacking uniform inf-sup stability", SIAM J. Numer. Anal. 58.
2021 [F. Bonizzoni and DP, "Shape optimization for a noise reduction problem by non-intrusive parametric reduced modeling", Proc. WCCM-ECCOMAS2020.
⌊ F. Nobile and DP, "Non-intrusive double-greedy parametric model reduction by interpolation of frequency-domain rational surrogates", ESAIM:M2AN 55.
2022 [DP and F. Nobile, "A technique for non-intrusive greedy piecewise-rational model reduction of frequency response problems over wide frequency bands", J. Math. Ind. 12.

Pending articles

2020 [DP and F. Nobile, "Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation", to appear in SCEE 2020 Proc..
2021 [F. Bonizzoni, DP, and M. Ruggeri, "Rational-based model order reduction of Helmholtz frequency response problems with adaptive finite element snapshots", under review.

Presentations at conferences

2019 [DP, F. Nobile, F. Bonizzoni, and I. Perugia, "A technique for rational model order reduction of parametric problems lacking uniform inf-sup stability", GAMM 2019, Vienna (A).
DP, F. Nobile, F. Bonizzoni, and I. Perugia, "A technique for rational model order reduction of parametric problems lacking uniform inf-sup stability", ICIAM 2019, Valencia (E).
⌊ DP and F. Nobile, "Interpolatory rational model order reduction of parametric problems lacking uniform inf-sup stability", ENUMATH 2019, Egmond aan Zee (NL).
2021 [DP, F. Nobile, and F. Bonizzoni, "Non-intrusive model reduction of parametric frequency response problems via minimal rational interpolation", ICOSAHOM 2020/2021 (virtual), Vienna (A).
DP and F. Nobile, "Non-intrusive model reduction of parametric frequency-response problems – with applications to UQ", SIMAI 2020+2021, Parma (I).

Posters

2018 F. Bonizzoni, I. Perugia, F. Nobile, and DP, "An efficient algorithm for Padé-type approximation of the frequency response for the Helmholtz problem", MoRePaS IV, Nantes (F).

F. Bonizzoni, I. Perugia, F. Nobile, and DP, "An efficient algorithm for Padé-type approximation of the frequency response for the Helmholtz problem", Swiss Numerics Day 2018, Zurich (CH).

2020 DP and F. Nobile, "Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation", SCEE 2020, Eindhoven (NL).

DP and F. Nobile, "Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation", MORSS 2020 (virtual), Lausanne (CH).

Others

2018 DP, F. Nobile, F. Bonizzoni, and I. Perugia, "Fast Least-Squares Padé approximation of self-adjoint problems with meromorphic structure", seminar, MATHICSE retreat, Sainte-Croix (CH).

DP, F. Nobile, F. Bonizzoni, and I. Perugia, "Fast Least-Squares Padé approximation of self-adjoint problems with meromorphic structure", workshop talk, DRWA, Alba di Canazei (I).

2019 DP and F. Nobile, "Polynomial approximation of resonance manifolds", short seminar, MATHICSE retreat, Champéry (CH).

2020 DP, "Padé approximation: a quick overview", seminar (virtual), CSQI talks, Lausanne (CH).

DP, "From Padé approximation to rational interpolation", seminar (virtual), CSQI talks, Lausanne (CH).

DP, "Minimal rational approximation", seminar (virtual), CSQI talks, Lausanne (CH).

DP, "Minimal rational approximation: a model reduction tool for parametrized PDEs with resonances", seminar (virtual), PDE Afternoons, Vienna (A).

2021 DP, "Matching-based pMOR for dynamical systems", seminar (virtual), CSQI talks, Lausanne (CH).

Teaching experience

2017 Analyse avancée I, Mathematics, EPFL.

2018 Analyse numerique, Mechanical Engineering, EPFL.

Analyse fonctionnelle, Mathematics, EPFL.

2019 Introduction to partial differential equations, Mathematics, EPFL.

2021 Numerical analysis and computational mathematics, Computational Sciences, EPFL.

2019–2021 Parallel and high-performance computing, Computational Sciences, EPFL.

(Including preparation of course&exercise material, preparation and grading of assignments&exams.)

Other service

2019 Supervision of B.Sc. thesis: "Approximation numérique du spectre des opérateurs elliptiques d'ordre deux" by T. Chanay, EPFL.

2020 Conference organizer, Model Order Reduction Summer School 2020 (virtual event).

Referee for scientific journals: Advances in Computational Mathematics.

2022 [Supervision of M.Sc. project: “Rational approximation for the frequency response of the time-harmonic Maxwell’s equations” by F. Matti, EPFL.

Computer skills

Advanced [Matlab, C/C++, OpenMP, MPI, Python, FreeFem++, LaTeX.
Intermediate [CUDA, C#, HTML.
Basic [R, OpenFOAM, Fluent, Fortran, Java.

Languages

Italian:	Mothertongue	English:	Fluent
French:	Intermediate	Japanese:	Basic
German:	Basic		