Andrea Brugnoli

+33 7 50 39 47 27 • andrea.brugnoli92@gmail.com
andrea.brugnoli • andrea.brugnoli

Academic Positions

University of Twente **Enschede**
Post-Doctoral researcher *November 2020-November 2022*
Numerical methods for coupled port-Hamiltonian fluid-structure dynamics
ERC Advanced grant. Principal investigator: Stefano Stramigioli

Education

ISAE-Supaero **Toulouse**
PhD in Automatic Control *October 2017-October 2020*
A port-Hamiltonian formulation of flexible structures: modelling and symplectic finite element discretization.
Supervisors: Daniel Alazard, Valérie Pommier-Budinger and Denis Matignon

Université Paris Saclay/ Supélec **Paris/Toulouse**
Research Master in automatics and image processing *2016–2017*
Courses: inverse problem, advanced dynamics of flexible structures, parameter estimation.

ISAE-Supaero **Toulouse**
Double degree in aerospace and astronautical engineering *2015–2017*
Specialisation in applied mathematics and advanced automatics: multidisciplinary optimisation, high performance computing, control of flexible structures.

Politecnico di Milano **Milan**
Master in space engineering, 110/110 cum laude *2014–2017*
Courses: orbital mechanics, structural dynamics and control, thermochemical propulsion.

Politecnico di Milano **Milan**
Mechanical Engineering Degree, 110/110 cum laude *2011–2014*
Courses: finite element method, mechanical vibrations, numerical methods for engineering.

Experiences

ITA-Instituto Tecnológico de Aeronáutica **São José dos Campos**
Visiting researcher *January 2019, 4 months*
Collaboration with Flavio Cardoso-Riberio on numerical methods for port-Hamiltonian systems.

CNES-Centre des études spatiales **Toulouse**
Internship *2017, 6 months*
Analysis of dismissed satellites subjected to solar pressure to identify stable pointing configurations and periodical behaviours.

Politecnico di Milano in partnership with Danieli S.p.A **Milan**
Bachelor project *2014, 3 months*
Dynamics of a forging manipulator: kinematics modelisation and dynamic analysis. Our project was selected for a final presentation at Danieli.

Languages

Italian: native speaker

English: fluent (Toeic 965/990)

French: fluent

Spanish: intermediate

Brazilian portuguese: intermediate

Computer skills

Softwares and platforms: Simulink, Abaqus, Inventor, Solid Works, Labview

Languages: Python (especially FEM librairies: FEniCS and Firedrake), Matlab, Java, C, LaTeX

OS: Linux environment (Fedora, Ubuntu)

References

Denis Matignon
Department of Applied Mathematics
ISAE-Supaero
Toulouse, 31055 (FR)
10 Avenue Edouard Belin
denis.matignon@isae.fr
0033-661741511

Paul Kotyzca
Department of Mechanical Engineering
Technical University of Munich
Munich, 85748 (GE)
Boltzmannstr. 15
kotyczka@tum.de

Daniel Alazard
Department of Space and Aeronautics Vehicle Dynamics
ISAE-Supaero
Toulouse, 31055 (FR)
10 Avenue Edouard Belin
daniel.alazard@isae.fr
0033-634981322

Laurent Lefèvre
Laboratory for system conception and integration
Université de Grenoble Alpes, LCIS
Valence, F26902 (FR)
50 rue Laffémas
laurent.lefevre@lcis.grenoble-inp.fr

Publications

International journal articles

[1] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Port-Hamiltonian formulation and symplectic discretization of plate models. Part I: Mindlin model for thick plates. *Applied Mathematical Modelling*, 75:940 – 960, Nov 2019. https://doi.org/10.1016/j.apm.2019.04.035.

[2] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Port-Hamiltonian formulation and symplectic discretization of plate models. Part II: Kirchhoff model for thin plates. *Applied Mathematical Modelling*, 75:961 – 981, Nov 2019. https://doi.org/10.1016/j.apm.2019.04.036.

[3] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Port-Hamiltonian flexible multibody dynamics. *Multibody System Dynamics*, 51(3):343–375, Mar 2021.

[4] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. A port-Hamiltonian formulation of thermoelasticity and its mixed finite element discretization. *Journal of Thermal Stresses*, 2021. Accepted for publication.

International conferences

[5] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Partitioned finite element method for the Mindlin plate as a port-Hamiltonian system. In *3rd IFAC Workshop on Control of Systems*

Governed by Partial Differential Equations CPDE 2019, pages 88 – 95, Oaxaca, MX, 2019. https://doi.org/10.1016/j.ifacol.2019.08.016.

[6] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Interconnection of the Kirchhoff plate within the port-Hamiltonian framework. In *Proceedings of the 59th IEEE Conference on Decision and Control*, Dec 2019.

[7] F. L. Cardoso-Ribeiro, A. Brugnoli, D. Matignon, and L. Lefèvre. Port-Hamiltonian modeling, discretization and feedback control of a circular water tank. In *Proceedings of the 59th IEEE Conference on Decision and Control*, Dec 2019.

[8] A. Brugnoli, F. L. Cardoso-Ribeiro, G. Haine, and P. Kotyzca. Partitioned finite element method for power-preserving structured discretization with mixed boundary conditions. Accepted for the 21st IFAC World congress, Jul 2020.

[9] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Structure-preserving discretization of port-Hamiltonian plate models. Accepted for the 24st International Symposium on Mathematical Theory of Networks and Systems, Aug 2021.

Interests

Tutor of mathematics and physics for bachelor students.

Lindy Hop, tennis, travelling, literature and cinema.