

Andrea Brugnoli

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Education

ISAE-Supaero

PhD candidate in Automatic Control

Toulouse
October 2017–October 2020

A port-Hamiltonian formulation of flexible structures: modelling and symplectic finite element discretization.

Supervisors: Daniel Alazard and Valérie Pommier-Budinger

Université Paris Saclay/ Supélec

Research Master in automatics and image processing

Paris/Toulouse

2016–2017

Courses: inverse problem, advanced dynamics of flexible structures, parameter estimation.

ISAE-Supaero

Double degree in aerospace and aeronautical engineering

Toulouse

2015–2017

Specialisation in applied mathematics and advanced automatics: multidisciplinary optimisation, high performance computing, control of flexible structures.

Politecnico di Milano

Master in space engineering, 110/110 cum laude

Milan

2014–2017

Courses: orbital mechanics, structural dynamics and control, thermochemical propulsion.

Politecnico di Milano

Mechanical Engineering Degree, 110/110 cum laude

Milan

2011–2014

Courses: finite element method, mechanical vibrations, numerical methods for engineering.

Liceo Classico Scipione Maffei

High school diploma, 100/100

Verona

2006–2011

Experiences

ITA-Instituto Tecnológico de Aeronáutica

Visiting researcher

São José dos Campos

January 2019, 4 months

Collaboration with Flavio Cardoso-Riberio on numerical methods for port-Hamiltonian systems.

CNES-Centre des études spatiales

Internship

Toulouse

2017, 6 months

Analysis of dismissed satellites subjected to solar pressure to identify stable pointing configurations and periodical behaviours.

ISAE-Supaero in partnership with LAAS

Industrial and entrepreneurial project

Toulouse

2016, 5 months

Intelligent teleoperations and optimal control for micro-drones systems (six people team).

Politecnico di Milano in partnership with Danieli S.p.A

Bachelor project

Milan

2014, 3 months

Dynamics of a forging manipulator: kinematics modelisation and dynamic analysis. Presented 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
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Paul Kotyzca

Department of Mechanical Engineering
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Daniel Alazard

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Laurent Lefèvre

Laboratory for system conception and integration
Université de Grenoble Alpes, LCIS
Valence, F26902 (FR)
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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. *arXiv preprint arXiv:2002.12816*, 2020. Under Review.

International conferences

- [4] 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>.
- [5] 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.

- [6] 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.
- [7] 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.
- [8] A. Brugnoli, D. Alazard, V. Pommier-Budinger, and D. Matignon. Structure-preserving discretization of port-Hamiltonian plate models. Submitted to the 24th International Symposium on Mathematical Theory of Networks and Systems, Aug 2020.

Interests

Tutor of mathematics and physics for bachelor students.

Lindy Hop, tennis, travelling, literature and cinema.