CV

NAME	**Yahao Chen**

CONTACT INFORMATION

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RESEARCH INTERESTS

Differential-algebraic equations (DAEs) and non-smooth systems.

Nonlinear control theory: Geometric and algebraic methods, observer.

Switching systems, time-delay systems.

Torque observer for Permanent Magnet Synchronous Motors (PMSMs).

PROFESSIONAL EXPERIENCE

Hycomes Team, Centre Inria de l'Universite de Rennes, France

Tenured Researcher (ISFP, December 2023-Now)

Centrale Nantes, LS2N UMR CNRS 6004, France

Postdoctoral Research Fellow, (Systems and Control, January 2022-November 2023)

- Project: "*Input observation of nonlinear time-delayed systems and its application to torque estimations of electric motors*" (PI: M.Ghanes, J. Barbot), Funded by Ecole Centrale de Nantes and Renault France.

University of Groningen (RUG), the Netherlands

Postdoctoral Researcher (Applied Mathematics, October 2019-November 2021)

- Project: "*Analysis and control of switched differential algebraic equations*" (PI: S. Trenn), NWO Vidi grant 639.032.733.

EDUCATION

Institut National des Sciences Appliquees (INSA) de Rouen, France

PhD (Applied Mathematics, October 2015-June 2019)

- Dissertation: "*Geometric analysis of differential-algebraic equation control systems: linear, nonlinear and linearizable*"

Northeastern University (NEU), China

MSc (Control Science and Engineering, September 2012-July 2015)

- Dissertation: "*Anti-windup Compensator for Control Systems Subject to Actuator Saturation*"

UNDER REVIEWS

G. Zhang, J. Jia*, J. Jiao and Y. Chen (2023), Strong structural controllability analysis of structured networks with identical nodes, *Automatica*.

JOURNAL PUBLICATIONS

Y. Chen*, M. Ghanes, A. Fekik and A. Maloum (2025), Torque observation of WRSM with model uncertainties for EV applications, *IEEE Transactions on Control Systems Technology*.

Y. Chen*, J-P. Barbot and M. Ghanes (2024), Implicit function theorem for nonlinear time-delay systems with algebraic constraints, *IEEE Transactions on Automatic Control*.

Y. Chen* and S. Trenn (2023), On impulse-free solutions and stability of switched nonlinear differential-algebraic equations, *Automatica* (Regular Paper).

Y. Chen*, J-P. Barbot and M. Ghanes (2023), Strong left-invertibility and strong input-observability of nonlinear time-delay systems, *IEEE Control Systems Letters*.

Y. Chen* and S. Trenn (2022), Impulse-free jump solutions for nonlinear differential-algebraic equations, *Nonlinear Analysis: Hybrid Systems*.

Y. Chen* and W. Respondek (2022), Geometric analysis of nonlinear differential-algebraic equations via nonlinear control theory, *Journal of Differential Equations*.

Y. Chen* (2022), Feedback linearization of nonlinear differential-algebraic control systems, *International Journal of Robust and Nonlinear Control*.

Y. Chen* and W. Respondek (2021), From Morse triangular form of ODE control systems to feedback canonical form of DAE control systems, *Journal of the Franklin Institute*.

Y. Chen*, S. Trenn and W. Respondek (2021), Normal forms and internal regularization of nonlinear differential-algebraic control systems, *International Journal of Robust and Nonlinear Control*.

Y. Chen* and W. Respondek (2021), Geometric analysis of differential-algebraic equations via linear control theory, *SIAM Journal on Control and Optimization*.

CONFERENCES & PATENT

Y. Chen* S. Trenn (2024), Solution concepts for linear piecewise affine differential-algebraic equations, *IEEE Conference on Decision and Control* (IEEE CDC 2024).

Y. Chen* and S. Trenn (2022), Stability analysis of switched nonlinear differential-algebraic equations via nonlinear Weierstrass form, *European Control Conference* (ECC 2022).

Y. Chen* and S. Trenn (2021), An approximation for nonlinear differential-algebraic equations via singular perturbation theory, *IFAC Conference on Analysis and Design of Hybrid Systems* (IFAC ADHS 2021).

Y. Chen* and S. Trenn (2021), The differentiation index of nonlinear differential-algebraic equations versus the relative degree of nonlinear control systems, *Proceedings in Applied Mathematics and Mechanics* (PAMM 2021).

Y. Chen* and S. Trenn (2020), On geometric and differentiation index of nonlinear differential-algebraic equations, *International Symposium on Mathematical Theory of Networks and Systems* (IFAC MTNS 2020).

Y. Chen* and W. Respondek (2019), Yahao Chen, Witold Respondek, Internal and External Linearization of Semi-Explicit Differential Algebraic Equations, *IFAC Symposium on Nonlinear Control Systems* (IFAC NOLCOS 2019).

J. Dong, Y. Chen, G.H. Yang (2014), Reliable fuzzy stabilization against sensor faults, *International Conference on Mechatronics and Control* (IEEE ICMC 2014).

M. Ghanes, A. Fekik and A. Maloum (2024), Torque observation for a wound rotor synchronous machine with model uncertainties (Submitted Patent, Renault SAS).

TEACHING EXPERIENCE

Winter	2024-2025	Lecturer, **Advanced Control of Electric Propulsion System**, Ecole Centrale Nantes
Spring	2022	Supervisor, **Epico-Project of Erasmus Master Students**, Ecole Centrale Nantes
Spring	2021	TA, **Project Systems Theory**, University of Groningen
Winter	2020	Lecturer, **Advanced Systems Theory**, University of Groningen
Spring	2018	TA, **Calculus Differential**, INSA de Rouen

SCIENTIFIC ACTIVITIES

Reviewer for **Automatica, IEEE Transactions on Automatic Control, System Control Letters, IEEE Control System Letters, Nonlinear Analysis: Hybrid Systems, International Journal of Robust and Nonlinear Control, Linear Algebra and its Applications.**

ENGINEERING PROJECT EXPERIENCE

2022–Now	Torque and position observations for Renault PMSM electrical motor via Dspace experimental platform. (main participate)
	Chair: Prof. Malek Ghanes
	Centrale Nantes and Renault Group, France.
2013–2014	Research on control algorithms design for Denso 6-Axis robot arm via DENSO experimental platform. (participate)
	PI: Prof. Jiuxiang Dong
	Institute of Navigation and Control Theory, NEU, China.
2011–2012	Control system design and simulation of a quadrotor.
	Institute of Navigation and Control Theory, NEU, China.

SKILLS

Languages:	English (working language), French (TCF B1), Chinese (native).
Programing:	C/C++, Python.
Others:	LaTeX, Matlab/Simulink, Maple, Mathematica.

REFERENCES

Prof. Jean-Pierre Barbot, ENSEA, Quartz EA 7393 and Centrale Nantes, LS2N UMR CNRS 6004, France, barbot@ensea.fr

Prof. Stephan Trenn, Faculty of Science and Engineering Systems, Control and Applied Analysis, Bernoulli Institute, Nijenborgh 99747 AG Groningen, The Netherlands, s.trenn@rug.nl

Prof. Benoit Caillaud, INRIA Rennes / IRISA, Campus de Beaulieu 35042 Rennes cedex France, benoit.caillaut@inria.fr