Matteo Della Rossa

Age	33	**Email**	matteo.dellarossa@polito.it
Nationality	Italian		

(Dark green text is hyperlink)

Education and Career

'11-'15   Bachelor in Mathematics - University of Udine / Italy

'15-'17   Master in Mathematics (110/110 cum laude) - University of Udine / Italy

Thesis's Title: *Esistence And Uniqueness Results in Nonlinear Analysis*
Under the diretion of Prof. *Fabio Zanolin*

'17-'20   Ph.D. in Automatic Control - University of Toulouse, INSA
& Laboratory for Analysis and Architecture of Systems (LAAS-CNRS) / Toulouse, France

Thesis's Title: *Non-Smooth Lyapunov Functions for Stability Analysis of Hybrid Systems*
Under the direction of Dr. *Aneel Tanwani* and Prof. *Luca Zaccarian*

2-months visiting period at Imperial College London, London / UK
Under the direction of Prof. *David Angeli*

Nov '20 -   Université Catholique de Louvain - *Louvain-La-Neuve / Belgium*
May '23   *Postdoc / ICTEAM*

Part of the Project of the European Research Council (ERC) under the *European Union's Horizon 2022 research and innovation program*, grant agreement No 864017 - L2C.
Principal Investigator: Prof. *Raphaël M. Jungers.*

Jun '23-   Università degli Studi di Udine - *Udine / Italy*
Jun' 25   *Postdoc / Assegnista di Ricerca*

"Nonlinear evolution problems and applications to optimal control of epidemic models."
"Problemi di evoluzione nonlineari e applicazioni al controllo ottimo di epidemie"
Principal Investigator: Prof. *Lorenzo Freddi.*

Sep '25-   Politecnico di Torino - *Turin / Italy*
Dipartimento di Elettronica e Telecomunicazioni, Automatica Research Group

Assistant Professor (Fixed-term, tenure-track) / RTD-B

Research Papers

Journal (published)

1. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2020). Max-min Lyapunov functions for switched systems and related differential inclusions. *Automatica*, vol. 120, 109123.

2. Della Rossa, M. and Goebel, R. and Tanwani, A. and Zaccarian, L.(2021). Piecewise structure of Lyapunov functions and densely checked decrease conditions for hybrid systems. *Math. Control Signals Syst.* , vol. 33, pp. 123-149.

3. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2021). Non-pathological ISS-Lyapunov functions for interconnected differential inclusions. *IEEE Transactions on Automatic Control, vol. 67, no. 8, pp. 3774-3789.*

4. Della Rossa, M. and Tanwani, A. (2022). Instability of dwell-time constrained switched nonlinear systems. *Systems & Control Letters*, vol. 162, 105164.

5. Della Rossa, M. and Pasquini, M. and Angeli, D. (2022). Continuous-time switched systems with switching frequency constraints: Path-complete stability criteria. *Automatica*, vol. 137, 110099.

6. Debauche, V. and Della Rossa, M. and Jungers, R. (2022) Comparison of path-complete Lyapunov functions via template-dependent lifts. *Nonlinear Analysis: Hybrid Systems*, vol. 46, 101237.

7. Della Rossa, M. and Jungers, R. (2023) Interpretability of Path-Complete Techniques and Memory-Based Lyapunov Functions *IEEE Control Systems Letters* , vol. 7, 781 - 786.

8. Della Rossa, M. and Egidio, L. N. and Jungers, R. (2023) Stability of switched affine systems: arbitrary and dwell-time switching *SIAM Journal on Control and Optimization*, Vol. 61, Iss. 4.

9. Nayak S.P. and Egidio, L. N. and Della Rossa M. and Schmuck A.-K. and Jungers, R. (2023) Context-Triggered Abstraction-Based Control Design *IEEE Open Journal of Control Systems*, Vol. 2, pp. 277-296.

10. Della Rossa, M. and Alves Lima, T and Jungers, M. and Jungers, R. (2024). Graph-based conditions for feedback stabilization of switched and LPV systems. *Automatica*, vol. 160, 111427.

11. Della Rossa, M. (2024) Converse Lyapunov Results for Switched Systems with Lower and Upper Bounds on Switching Intervals. *Automatica*, vol. 163, 111576.

12. Della Rossa, M. and Alves Lima, T. and Girard, A (2024) Feedback Stabilization of Discrete-Time Switched Systems Under Büchi-Constrained Signals. *IEEE Control Systems Letters*.

13. Della Rossa, M. and Jungers, R. (2024) Multiple Lyapunov Functions and Memory: A Symbolic Dynamics Approach to Systems and Control *SIAM Journal on Control and Optimization*, Vol. 62, Iss. 5.

14. Breda, D. and Della Rossa, M. and Freddi, L. (2025) Viability and control of a delayed SIR epidemic with an ICU state constraint *ESAIM: COCV*, Vol. 31, 9.

15. Della Rossa, M. and Freddi, L. and Goreac, D. (2025) Optimality of vaccination for an SIR epidemic with an ICU constraint *Journal of Optimization Theory and Applications* Vol. 204, 8.

16. Della Rossa, M. and Tanwani, A. (2025) Converse Lyapunov Results for Stability of Switched Systems with Average Dwell-Time *ESAIM: COCV*, Vol. 31, 15.

Journal (submitted)

1. Della Rossa, M. and Alves Lima, T. and Girard, A (n.d.) Feedback stabilization of switched systems under arbitrary switching: A convex characterization.

2. Della Rossa, M. and Freddi, L. (n.d.) Pattern-preserving optimal control problems with increasing time horizon

International Conferences (published)

1. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2018). Max-min Lyapunov functions for switching differential inclusions. *IEEE 57th Conference on Decision and Control (CDC)*, pages. 5664-5669.

2. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2019). Smooth approximation of patchy Lyapunov functions for switched systems. *11th IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, pages. 2405-8963.

3. Della Rossa, M. and Goebel, R. and Tanwani, A. and Zaccarian, L. (2019). Almost everywhere conditions for hybrid Lipschitz Lyapunov functions. *IEEE 58th Conference on Decision and Control (CDC)*, pages. 8148-8153.

4. Della Rossa, M. and Pasquini, M. and Angeli, D. (2020). Path-complete Lyapunov functions for continuous-time switching systems. *IEEE 59th Conference on Decision and Control (CDC)*, pages. 3279-3284.

5. Debauche, V. and Della Rossa, M. and Jungers, J. (2021). Template-dependent lifts for path-complete stability criteria and application to positive switching systems. *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, pages. 151-156.

6. Della Rossa, M. and Wang, Z. and Egidio, L.N. and Jungers, R. (2021). Data-driven stability analysis of switched affine systems. *IEEE 60th Conference on Decision and Control (CDC)*, pages. 3204-3209.

7. Debauche, V. and Della Rossa, M. and Jungers, R. (2022) Necessary and sufficient conditions for template-dependent ordering of path-complete Lyapunov methods. *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*

8. Della Rossa, M. and Jungers, R. (2022)Almost sure Stability of Stochastic Switched Systems: Graph lifts-based Approach*IEEE 61th Conference on Decision and Control (CDC)*

9. Alves Lima, T. and Della Rossa, M. and Gouaisbaut, F. and Jungers, M. and Tarbouriech, S. (2022) Switched systems approach to stability of systems with both constant and time-varying delays *IEEE 61th Conference on Decision and Control (CDC)*

Teaching

Jan '19 -	Basic Mathematics
Jun '19	*IUT-GMP Toulouse-Université Toulouse III Paul Sabatier, 64h*
	Doctorant Chargé d'Enseignement/ PhD teaching assistant

Sep '19 -	Tutorial in Linear Algebra and Analysis
Jan '20	*INSA Toulouse- Génie Mathématique et Modélisasion, 18h*
	PhD teaching assistant

Sep '21 -	LINMA2380 - Matrix Computations
Jan '22	*Université catholique de Louvain (UCLouvain), Louvain-La-Neuve, Belgium, 20h*
	Teaching assistant

Sep '22 -	LINMA2380 - Matrix Computations
Jan '23	*Université catholique de Louvain (UCLouvain), Louvain-La-Neuve, Belgium, 20h*
	Teaching assistant

Sep '23 -	Basic Calculus (Analisi)
Jan '24	*Università degli Studi di Udine, Civil and Electronic Engineering/Computer Science, 1st year (70h)*
	Teaching assistant

Sep 24 ' -	Basic Calculus (Analisi Matematica 1)
Jan'25	*Università degli Studi di Udine, Industrial Engineering (Ingegneria Industriale per l'Energia), 1st year (96h)*
	Adjunct professor (Incarico di insegnamento)

Reviewer and Editorial activities

I have been a reviewer for several journals in optimization and automatic control fields, such as *SIAM Journal on Control and Optimization*, *Automatica*, *IEEE Transactions on Automatic Control*, *Systems and Control Letters*, *IEEE Control Systems Letters*, *Nonlinear Analysis: Hybrid Systems*, and for international conferences relevant to the sector, such as *IEEE Conference on Decision and Control*, *IFAC World Congress*.

Awards

2023 Nonlinear Analysis: Hybrid Systems Paper Prize

Awarded to the Paper: "*Comparison of path-complete Lyapunov functions via template-dependent lifts*" joint work with V. Debauche and R. M. Jungers".
Consigned at IFAC World Congress 2023, Yokohama, Japan

Invited Lectures

05/09/2019	Title: "Smooth Approximation of Patchy Lyapunov Functions for Switched Systems" *11th IFAC Symposium on Nonlinear Control Systems (NOLCOS), Vienna, Austria*
12/12/2019	Title: "Almost Everywhere Conditions for Hybrid Lipschitz Lyapunov Functions" *IEEE 58th Conference on Decision and Control (CDC) Nice, France*
09/11/2020	Title: "Path-complete techniques and contiunous-time systems, recent developements" *ICTEAM, Cyber-Physical systems research group weekly meeting, Louvain-La-Neuve, Belgique*
16/12/2020	Title: "Path-complete Lyapunov functions for continuous-time switching systems" *IEEE 59th Conference on Decision and Control (CDC) (Virtual)*
15/12/2021	Title: "Data-Driven Stability Analysis of Switched Affine Systems" *IEEE 60th Conference on Decision and Control (CDC) (Virtual)*
09/06/2022	Title: "Dwell-time stability analysis for switched systems: from linear to (very structured) non-linear subsystems" *Séminaire d'Automatique du Plateau de Saclay, L2S, CentraleSupélec, Paris-Saclay, France*
07/12/2022	Title: "Almost sure Stability of Stochastic Switched Systems: Graph lifts-based Approach" *IEEE 61th Conference on Decision and Control (CDC), Cancun, Mexico)*
26/01/2023	Title: "Dwell-time stability analysis for switched systems: from linear to (very structured) non-linear subsystems" *Centre Automatique et Systèmes (CAS), Paris, Mines Paris Tech, France*
13/03/2024	Title: "Viability and control of a delayed SIR epidemic with an ICU State Constraint" *Dipartimeto di Scienze Matematiche, Informatiche e Fisiche, Università degli Studi di Udine, Italia*

Languages

	English	French	Portuguese (BR)	Italian
Speaking	Excellent	Excellent	Good	
Writing	Excellent	Very Good	Beginner	Mother tongue
Reading	Excellent	Excellent	Very Good	
Listening	Excellent	Excellent	Very Good	

General Skills

- **Programming Languages**

  MatLab

- **Miscellaneous**

  Google Apps
 Office Package
 LaTeX
 Driver's license "B"