

University Academic Curriculum Vitae

Personal details	Ludovico Ortombina
Current position	<ul style="list-style-type: none">• Assistant Professor (RTDb)• August 2023• International context• University of Padova• I have to teach the course "Renewable Electric Energy Conversion and Storage" (7 of 9 CFU) in the Electrical Engineering Master's Degree and the course "Veicoli Ibridi Elettrici" (4 of 9 CFU) in the Mechanical Engineering Master's Degree. Furthermore, I have to carry out research in the field of electric motor drives, such as sensorless motor control, motor parameter identification and model predictive current control.
Education since leaving school	<ul style="list-style-type: none">• 2013, Bachelor's degree in Mechanic and Mechatronics Engineering (curriculum Mechatronics) at University of Padova, vote 110/110 cum laude.• 2015, Master's degree in Mechatronics Engineering at University of Padova, vote 110/110 cum laude.• 2019, Ph.D. in Mechatronics and Product Innovation Engineering (curriculum Mechatronics) at University of Padova. Ph.D. thesis title is "Innovative solutions for converters and motor drives oriented to smart cities and communities." with supervisor prof. M. Zigliotto.
Experiences abroad	<ul style="list-style-type: none">• Apr-Jun/2019, Faculty of Information Technology and Communication Sciences, Tampere University, Finland, with supervisor prof. P. Karamanakos.• May-Oct/2017, Chair of Electrical Drive Systems and Power Electronics, Technical University of Munich (TUM), Germany, with supervisor prof. R. Kennel.
Professional experience	<ul style="list-style-type: none">• Aug 2020 – Aug 2023, Research fellow (RTDa), University of Padova• Jan 2019 – Aug 2020, research grant titled "Artificial neural networks-based more autonomous industrial AC drives", University of Padova, supervisor prof M. Zigliotto.
Teaching experience relevant to the position	<ul style="list-style-type: none">• Renewable Electric Energy Conversion and Storage – Responsible of the course (2023/2024) University of Padova SSD ING-IND/32 Master in Electrical Engineering English 56 hours Students study the renewable energy conversion process and the main storage technologies. A solar and wind converter is simulated with its overall control scheme by using Matlab/Simulink.• Green Power Conversion and Utilization – Responsible of the course (2020/2021, 2021/2022, 2022/2023) University of Padova SSD ING-IND/32 Master in Energy Engineering English 48 hours

Students study the main topology of power converters, namely DC/DC converters, half and full wave rectifiers and inverters. Some of these converters were simulated in Matlab/Simulink. Finally, some concepts on motor efficiency were introduced.

- Electric and Hybrid Mobility – Electric powertrains and batteries (2021/2022, 2022/2023)
Libera Università di Bolzano
SSD ING-IND/32
Master in Energy Engineering
English
30 hours
Students study the main electrical components in an electric car, namely, electric motors, power converters and batteries. Finally, fundamental design of a fully electric car is carried out.
- Veicoli Ibridi Elettrici (2021/2022, 2022/2023, 2023/2024)
University of Padova
SSD ING-IND/32
Master in Mechanical Engineering
English
32 hours
Students study the main electrical components in an electric car, namely, electric motors, power converters and batteries. Finally, fundamental design of a fully electric car is carried out.
- Electric Power Conversion Equipment – Laboratory assistant (2017-2018)
Free University of Bozen
SSD ING-IND/32
Master in Energy Engineering
English
24 hours
Students implemented an RC filter, visualizing waveforms with an oscilloscope. A brief introduction to Matlab and Simulink was made. Finally, some experiences based on Arduino were proposed and they were assisted in the development of the final projects.
- Electrical Drives Laboratory – Laboratory assistant (2017-2018)
University of Padova
SSD ING-IND/32
Master in Mechatronics Engineering
Italian
16 hours
Students had available a test bench composed by an induction and a PMSM motor in a back-to-back configuration. Each student had to identify the inverter and PMSM parameters and then develop a high-speed sensorless observer for the PMSM.
- AC Motor Drives – Laboratory assistant (2015/2016-2016/2017)
University of Padova
SSD ING-IND/32
Master in Mechatronics Engineering
Italian
8 hours
Students had available a test bench composed by an induction and a PMSM motor in a back-to-back configuration. Each student had to follow a given experience where they identified the motors parameters, the dead times of the inverters and tested some different control techniques on both motors.

Membership

- IEEE member,
- IEEE IES, IEEE IAS and IEEE PELS member
- Topic chair for the conference ECCE 2021, 2022, 2023, ITEC 2022 and IEMDC 2023

Research and scholarships

Project "Towards more effective fault-tolerant multi-phase electric drives", Department of Industrial Engineering, Università degli Studi di Padova, PI: Ludovico Ortombina, Received: 32.094,74€

Participation to conferences

- IEEE International Electric Machines & Drives Conference (IEMDC 2023, San Francisco, USA, May 15-18, 2023.
- IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD 2023), Newcastle upon Tyne, UK, Apr. 13-14, 2023.
- IEEE energy conversion congress and exposition (ECCE 2022), Detroit, USA, Oct. 9-13, 2022.
- Optimization of Electrical & Electronic Equipment (OPTIM 2021), Brasov, Romania, Sept. 2-3, 2021.
- Twenty-one IEEE workshop on control and modeling for power electronics (COMPEL 2020), Aalborg, Denmark, Nov 9-12, 2020.
- International symposium on sensorless control of electrical drives (SLED 2019), Torino, Italy, Sept. 9-10, 2019.
- Nineteenth IEEE workshop on control and modeling for power electronics (COMPEL 2018), Padova, Italy, June 25-28, 2018.
- IEEE international conference on power electronics and drive systems (PEDS 2017), Honolulu, USA, Dec. 12-15, 2017.
- IEEE energy conversion congress and exposition (ECCE 2017), Cincinnati, USA, Oct. 1-5, 2017.

Statement of interest

- I consider myself suitable for the advertised position because during my studies I dealt with the topics to be taught. Moreover, I teach the same topic to Università degli Studi di Padova. Furthermore, I like teaching and conveying concepts to students.

Language competence

English B2

Date 25/03/2024

Scientific publications related to the teaching position

1. Improved Sensorless Control of Multiphase Synchronous Reluctance Machine Under Position Sensor Fault
 - Authors: G. Galati, L. Ortombina, L. Alberti, M. Berto
 - Journal: IEEE Journal of Emerging and Selected Topics in Industrial Electronics
 - Year: 2024
 - DOI: 10.1109/JESTIE.2023.3294100
2. Long-Horizon Robust Direct Model Predictive Control for Medium-Voltage Induction Motor Drives With Reduced Computational Complexity
 - Authors: A. Tregubov, P. Karamanakos, L. Ortombina
 - Journal: IEEE Transaction on Industry Application
 - Year: 2022
 - DOI: 10.1109/TIA.2022.3219042
3. Sensorless Drive for Salient Synchronous Motors based on Direct Fitting of Elliptical-Shape High-Frequency Currents
 - Authors: L. Ortombina, M. Berto, L. Alberti
 - Journal: IEEE Transaction on Industrial Electronics
 - Year: 2022
 - DOI: 10.1109/TIE.2022.3177753
4. A Review about Flux-Weakening Operating Limits and Control Techniques for Synchronous Motor Drives
 - Authors: N. Bianchi, P.G. Carlet, L. Cinti, L. Ortombina
 - Journal: MDPI Energies
 - Year: 2022
 - DOI: 10.3390/EN15051930
5. Fast Solver for Implicit Continuous Set Model Predictive Control of Electric Drives
 - Authors: A. Favato, P. G. Carlet, F. Toso, R. Torchio, L. Ortombina, M. Bruschetta, R. Carli, P. Alotto, S. Bolognani, J. Rodriguez.
 - Journal: IEEE Access
 - Year: 2022
 - DOI: 10.1109/ACCESS.2022.3150283
6. Comprehensive analysis and design of a pulsating signal injection-based position observer for sensorless synchronous motor drives
 - Authors: L. Ortombina, D. Pasqualotto, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Journal of Emerging and Selected Topics in Power Electronics
 - Year: 2021
 - DOI: 10.1109/JESTPE. 2021.3053467
7. Magnetic Model Identification of Synchronous Motors Considering Speed and Load Transients
 - Authors: L. Ortombina, D. Pasqualotto, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Transaction on Industry Application
 - Year: 2020
 - DOI: 10.1109/ TIA.2020.300355
8. Adaptive Maximum Torque per Ampere Control of Synchronous Reluctance Motors by Radial Bases Function Networks
 - Authors: L. Ortombina, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Journal of Emerging and Selected Topics in Power Electronics
 - Year: 2019
 - DOI: 10.1109/ JESTPE.2018.2858842

9. Online Stator Resistance Tracking for Reluctance and Interior Permanent Magnet Synchronous Motors
 - Authors: R. Antonello, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Transaction on Industry Applications
 - Year: 2018
 - DOI: 10.1109/ TIA.2018.2819961
10. Magnetic Modelling of Synchronous Reluctance and Internal Permanent Magnet Motor Using Radial Basis Function Network
 - Authors: L. Ortombina, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Transaction on Industrial Electronics
 - Year: 2017
 - DOI: 10.1109/ TIE.2017.2733502
11. Enhanced Low-Speed Operations for Sensorless Anisotropic PM Synchronous Motor Drives by a Modified Back-EMF Observer
 - Authors: R. Antonello, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Transaction on Industrial Electronics
 - Year: 2017
 - DOI: 10.1109/ TIE.2017.2748042
12. Model Sensitivity of Fundamental-Frequency based Position Estimators for Sensorless PM and Reluctance Synchronous Motor Drives
 - Authors: S. Bolognani, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Journal: IEEE Transaction on Industrial Electronics
 - Year: 2017
 - DOI: 10.1109/ TIE.2017.2716902
13. Motor Vehicle Challenge 2023: The Winning Multi-physical Energy Management Algorithm
 - Authors: G. Galati, E. Scolaro, D. Michieletto, M. Beligoj, L. Ortombina
 - Conference: 2023 IEEE Vehicle Power and Propulsion Conference (VPPC)
 - Year: 2023
 - DOI: 10.1109/VPPC60535.2023.10403294
14. Experimental Tests of Fractional-Slot SPM Motor with Star-Delta Windings
 - Authors: N. Bianchi, L. Cinti, C. Contò, L. Ortombina
 - Conference: 2023 IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2023
 - DOI: 10.1109/ECCE53617.2023.10362861
15. Fault-Tolerant Analysis of Kalman Filter Sensor Fusion for Sensorless Control of a Multiphase Machine
 - Authors: G. Galati, L. Alberti, L. Ortombina
 - Conference: 2023 IEEE 14th International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives (SDEMPED)
 - Year: 2023
 - DOI: 10.1109/SDEMPED54949.2023.10271448
16. Robust Direct Model Predictive Control with Reduced Computational Effort for Medium-Voltage Grid-Connected Converters with LCL Filters
 - Authors: A. Tregubov, P. Karamanakos, L. Ortombina
 - Conference: 2023 25th European Conference on Power Electronics and Applications (EPE'23 ECCE Europe)
 - Year: 2023
 - DOI: 10.23919/EPE23ECCEurope58414.2023.10264541

17. Standstill Self-Commissioning Procedure for Synchronous Reluctance Motors based on Coenergy Model
 - Authors: L. Ortombina, N. Bianchi, L. Alberti
 - Conference: 2023 IEEE International Electric Machines & Drives Conference (IEMDC)
 - Year: 2023
 - DOI: 10.1109/IEMDC55163.2023.10238999
18. Constrained Model Predictive Control for Hybrid Excited Permanent Magnet Synchronous Motors
 - Authors: L. Cinti, L. Ortombina, P. Karamanakos, N. Bianchi
 - Conference: 2023 IEEE International Electric Machines & Drives Conference (IEMDC)
 - Year: 2023
 - DOI: 10.1109/IEMDC55163.2023.10239066
19. A reconfigurable multi-three-phase PM motor: nominal, overload and post-fault operations
 - Authors: N. Bianchi, L. Cinti, P. G. Carlet, L. Ortombina
 - Conference: 2023 IEEE International Electric Machines & Drives Conference (IEMDC)
 - Year: 2023
 - DOI: 10.1109/IEMDC55163.2023.10238857
20. Modelling of a Rotating Signal Injection-Based Position Observer for Sensorless Synchronous Electric Drives
 - Authors: G. Galati, L. Ortombina, L. Alberti
 - Conference: 2023 IEEE International Electric Machines & Drives Conference (IEMDC)
 - Year: 2023
 - DOI: 10.1109/IEMDC55163.2023.10238996
21. Dynamic model for HEPM motors including the nonlinear magnetic characteristics
 - Authors: P. G. Carlet, L. Cinti, L. Ortombina, N. Bianchi
 - Conference: 2023 IEEE International Electric Machines & Drives Conference (IEMDC)
 - Year: 2023
 - DOI: 10.1109/IEMDC55163.2023.10239046
22. Long-Horizon Robust Direct Model Predictive Control for Medium-Voltage Drives with Active Neutral-Point Potential Balancing
 - Authors: A. Tregubov, P. Karamanakos, L. Ortombina
 - Conference: 2023 IEEE International Conference on Predictive Control of Electrical Drives and Power Electronics (PRECEDE)
 - Year: 2023
 - DOI: 10.1109/PRECEDE57319.2023.10174601
23. Injectionless Full Range Speed Sensorless Control for Synchronous Reluctance Motors based on PWM Current Ripple
 - Authors: L. Ortombina, F. Bernardi, L. Alberti, D. Barater
 - Conference: 2023 IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD)
 - Year: 2023
 - DOI: 10.1109/WEMDCD55819.2023.10110945
24. Flux-Weakening Control of Hybrid-Excited Permanent Magnet Synchronous Motors
 - Authors: L. Cinti, P. G. Carlet, L. Ortombina, N. Bianchi
 - Conference: 2022 IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2022
 - DOI: 10.1109/ECCE50734.2022.9948090

25. Maximization of Sensorless Capabilities of Hybrid Excited Permanent Magnet Motors
 - Authors: L. Cinti, P.G. Carlet, L. Ortombina, N. Bianchi
 - Conference: 2022 International Conference on Electrical Machines (ICEM)
 - Year: 2022
 - DOI: 10.1109/ICEM51905.2022.9910877
26. Sensorless Motor Parameter-Free Predictive Current Control of Synchronous Reluctance Motor Drives
 - Authors: P. G. Carlet, F. Tinazzi, L. Ortombina, N. Bianchi
 - Conference: 2022 International Conference on Electrical Machines (ICEM)
 - Year: 2022
 - DOI: 10.1109/ICEM51905.2022.9910635
27. Investigation on the Self-Sensing Capability of a Dual Three-Phase Synchronous Reluctance Machine
 - Authors: G. Galati, L. Ortombina, L. Alberti, M. Berto
 - Conference: 2022 International Conference on Electrical Machines (ICEM)
 - Year: 2022
 - DOI: 10.1109/ICEM51905.2022.9910871
28. A Computationally Efficient Robust Direct Model Predictive Control for Medium Voltage Induction Motor Drives
 - Authors: A. Tregubov, P. Karamanakos, L. Ortombina
 - Conference: 2021 IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2021
 - DOI: 10.1109/ECCE47101.2021.9595296
29. PWM Torque Ripple Compensation for a Dual Three-Phase Synchronous Machine
 - Authors: C. Bianchini, A. Torreggiani, M. Davoli, A. Bellini, L. Ortombina, N. Bianchi
 - Conference: 2021 IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2021
 - DOI: 10.1109/ECCE47101.2021.9595675
30. Synchronous Motor Sensorless Drives based on Rotating Signal Injection and Direct Ellipse Estimation
 - Authors: L. Ortombina, M. Berto, L. Alberti
 - Conference: Optimization of Electrical & Electronic Equipment (OPTIM 2021)
 - Year: 2021
 - DOI: 10.1109/OPTIM-ACEMP50812.2021.9590071
31. Experimental Evaluation of Flux-Weakening Capability of Dual Three-Phase Synchronous Reluctance Motor
 - Authors: L. Ortombina, I. Husain, L. Alberti, N. Bianchi
 - Conference: Optimization of Electrical & Electronic Equipment (OPTIM 2021)
 - Year: 2021
 - DOI: 10.1109/OPTIM-ACEMP50812.2021.9590070
32. Robustness Analysis of Long-Horizon Direct Model Predictive Control: Induction Motor Drives
 - Authors: L. Ortombina, P. Karamanakos, M. Zigliotto
 - Conference: 2020 IEEE 21th Workshop on Control and Modeling for Power Electronics (COMPEL)

- Year: 2020
 - DOI: 10.1109/COMPEL49091.2020.9265655
33. Robustness Analysis of Long-Horizon Direct Model Predictive Control: Permanent Magnet Synchronous Motor Drives
- Authors: L. Ortombina, P. Karamanakos, M. Zigliotto
 - Conference: 2020 IEEE 21th Workshop on Control and Modeling for Power Electronics (COMPEL)
 - Year: 2020
 - DOI: 10.1109/COMPEL49091.2020.9265855
34. Automatic Tuning Procedure at Standstill for Extended Kalman Filter in Sensorless Control of Permanent Magnet Synchronous Motors
- Authors: L. Ortombina, D. Pasqualotto, F. Tinazzi, M. Zigliotto
 - Conference: IEEE 10th International Symposium on Sensorless Control for Electrical Drives (SLED)
 - Year: 2019
 - DOI: 10.1109/SLED.2019.8896350
35. Magnetic Model Identification for Synchronous Reluctance Motors Including Transients
- Authors: L. Ortombina, D. Pasqualotto, F. Tinazzi, M. Zigliotto
 - Conference: 2019 IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2019
 - DOI: 10.1109/ECCE.2019.8913164
36. Constrained Long-Horizon Direct Model Predictive Control for Synchronous Reluctance Motor Drives
- Authors: L. Ortombina, E. Liegmann, P. Karamanakos, F. Tinazzi, M. Zigliotto, R. Kennel
 - Conference: 2018 IEEE 19th Workshop on Control for Synchronous Reluctance Motor Drives
 - Year: 2018
 - DOI: 10.1109/COMPEL.2018.8460173
37. Advanced Current Control of Synchronous Reluctance Motors
- Authors: R. Antonello, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: IEEE International Conference on Power Electronics and Drive Systems (PEDS)
 - Year: 2017
 - DOI: 10.1109/PEDS.2017.8289150
38. Energy-Efficient Stand-Alone Solar Water-Pumping system for Synchronous Reluctance Motor
- Authors: L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: IEEE International Conference on Power Electronics and Drive Systems (PEDS)
 - Year: 2017
 - DOI: 10.1109/PEDS.2017.8289167
39. An Effective Start-up Algorithm for Sensorless Synchronous Reluctance and IPM motor Drives
- Authors: L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: IEEE International Conference on Power Electronics and Drive Systems (PEDS)
 - Year: 2017
 - DOI: 10.1109/PEDS.2017.8289164
40. Online Stator Resistance Tracking for Reluctance and Interior Permanent Magnet Synchronous motor
- Authors: R. Antonello, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: IEEE Energy Conversion Congress and Exposition (ECCE)
 - Year: 2017

- DOI: 10.1109/ ECCE.2017.8096970
41. Comprehensive Magnetic Modelling of internal PM Synchronous Motors Through Radial Basis Function Network
- Authors: L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: Annual Conference of IEEE Industrial Electronics Society (IECON)
 - Year: 2016
 - DOI: 10.1109/ IECON.2016.7793898
42. Model Sensitivity Assessment for Sensorless PM and Reluctance Motor Drives
- Authors: S. Bolognani, L. Ortombina, F. Tinazzi, M. Zigliotto
 - Conference: Annual Conference of IEEE Industrial Electronics Society (IECON)
 - Year: 2016
 - DOI: 10.1109/ IECON.2016.7793841