

Georgios Orfanoudakis

CURRICULUM VITAE

(Oct. 2022)

Personal details

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Summary

Assistant Professor of Power Electronics and Motor Control at the Electrical and Computer Engineering Department of the Hellenic Mediterranean University.

Research interests:

- Sensorless motor control
- Control of grid-connected inverters
- Phase-Locked Loops (PLLs) and their applications to sensorless motor control and grid synchronisation
- Transformerless inverter topologies for photovoltaics
- Multilevel converter topologies
- Inverter common-mode leakage current reduction
- Power quality and Electromagnetic compatibility (EMC)
- Power converter filter design and resonance damping
- Modelling, simulation and digital implementation of controllers for power converters

Research / R&D experience and collaborations

Apr. 2020 – Present

Technical University of Crete (TUC)

Research Associate in the research program of the Bilateral and Multilateral Research & Technology Co-operation between Greece and China with acronym eSOLAR: “Principle and control of high-efficiency Buck-Boost type Photovoltaic inverter”.

June 2015 – Present	TSL Technology Ltd, UK R&D consultant on Power Electronics for the design and control of variable-speed motor drives.
Oct. 2014 – Present	University of Southampton, UK Visiting Research Fellow.
Oct. 2012 – Oct. 2014	University of Southampton & TSL Technology Ltd Research Associate in a Knowledge Transfer Partnership (KTP) for the design and control of variable-speed motor drives rated from 50 to 320kVA.
May 2010 – Oct. 2010	TSL Technology Ltd PhD internship on converter loss estimation and inverter design.
Mar. 2007 – Sep. 2007	National Technical University of Athens, Knowledge and Database Systems Laboratory Research Assistant on the design and implementation of algorithms for Peer-to-Peer databases.

Teaching experience

Oct. 2019 – Present	Hellenic Mediterranean University (HMU), Electrical and Computer Engineering department - Teaching the undergraduate courses “Power Electronics” (5 th semester) and “Electric Motor Drives” (6 th semester), and performing their lab demonstrations. - Teaching the course “Power Systems Coupling and Power Electronics” and co-teaching the course “Electrical Energy Measurement and Power Quality” of the department’s postgraduate program on “Energy Systems”.
Oct. 2015 – Sept. 2019	Technological Educational Institute (TEI) of Crete, Electrical Engineering department - Taught the courses “Power Electronics” (5 th semester) and “Electric Motor Drives” (6 th semester), and performed their lab demonstrations. - Performed lab demonstrations of the courses “Electric Machines I” and “Electric Machines II”. - Co-taught courses on Power Electronics and Power Quality in the department’s postgraduate program on “Energy Systems”.
Feb. 2009 – Dec. 2010	University of Southampton Teaching assistant on “Electrical Systems” and lab demonstrator on “Electric Motors”.

Supervising experience

- 2015 – Present** **Hellenic Mediterranean University (HMU),
Electrical and Computer Engineering department**
- Have supervised 3 final-year undergraduate Theses and 2 post-graduate Theses related to power electronics, to completion, while 8 more are in progress.
- Jan. 2022 – Present** **University of Southampton**
- Co-supervising a PhD candidate as an external supervisor.

Education

- Sep. 2008 – Jan. 2013** **University of Southampton,
PhD on Power Electronic converters**
Thesis: “Analysis and reduction of DC-link capacitor voltage/current stress in three-level PWM converters”.
Supervisor: Prof Suleiman Sharkh.
- Sep. 2007 – Sep. 2008** **University of Southampton,
MSc Sustainable Energy Technologies**
Grade: Distinction.
- Oct. 2006 – Feb. 2007** **National and Kapodistrian University of Athens,
Departments of Mathematics and Computer Science**
Attended lectures on Algorithms, Logic and Computability (MSc level).
- 2000 – 2006** **National Technical University of Athens,
Diploma in Electrical Eng. and Computer Science**
Grade: 8.36 / 10.

Publications

Books

1. S. M. Sharkh, M. A. Abu-Sara, G. I. Orfanoudakis, and B. Hussain, “Power Electronic Converters for Microgrids”, John Wiley & Sons, ISBN 978-0-470-82403-0, May 2014.

Journals

1. G. I. Orfanoudakis, S. M. Sharkh and M. A. Yuratich, "Combined Positive-Sequence Flux Estimation and Current Balancing for Sensorless Motor Control Under Imbalanced Conditions," in *IEEE Transactions on Industry Applications*, vol. 57, no. 5, pp. 5099-5107, Sept.-Oct. 2021.
2. G. I. Orfanoudakis, M. A. Yuratich and S. M. Sharkh, "Nearest-Vector Modulation Strategies with Minimum Amplitude of Low-Frequency Neutral-Point Voltage Oscillations for the Neutral-Point-Clamped Converter", *IEEE Transactions on Power Electronics*, vol. 28, no. 10, pp. 4485-4499, Oct. 2013.
3. G. I. Orfanoudakis, M. A. Yuratich and S. M. Sharkh, "Hybrid Modulation Strategies for Eliminating the Low-Frequency Neutral-Point Voltage Oscillations in the Neutral-Point-Clamped Converter", *IEEE Transactions on Power Electronics*, vol. 28, no. 8, pp. 3653-3658, Aug. 2013.
4. G. I. Orfanoudakis, M. A. Yuratich and S. M. Sharkh, "Analysis of DC-link Capacitor Current in Three-Level Neutral-Point-Clamped and Cascaded H-Bridge Inverters", *IET Power Electronics*, vol. 6, no. 7, pp. 1376-1389, Aug. 2013.

Conferences

1. G. I. Orfanoudakis, E. Koutroulis, G. Foteinopoulos and W. Wu, "Evaluation of common-mode leakage current of Aalborg-type transformerless PV inverters," *24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe)*, 2022, pp. 1-10.
2. G. I. Orfanoudakis, G. Foteinopoulos, E. Koutroulis and W. Wu, "Design optimization of Aalborg-type transformerless PV inverters with focus on power quality," *2022 11th International Conference on Modern Circuits and Systems Technologies (MOCASST)*, 2022, pp. 1-5.
3. G. I. Orfanoudakis, E. Koutroulis, G. Foteinopoulos and W. Wu, "Synchronous Reference Frame current control of Aalborg-type PV inverters," *2021 23rd European Conference on Power Electronics and Applications (EPE'21 ECCE Europe)*, 2021, pp. 1-10.
4. G. I. Orfanoudakis, E. Koutroulis, M. A. Yuratich and S. M. Sharkh, "A three-phase transformerless Boost inverter for the reduction of common-mode leakage current in photovoltaic applications," *2021 23rd European Conference on Power Electronics and Applications (EPE'21 ECCE Europe)*, 2021, pp. 1-10.
5. G. I. Orfanoudakis, E. Koutroulis and G. Foteinopoulos, "The role of diodes in the leakage current suppression mechanism of decoupling transformerless PV inverter topologies," *2021 10th International Conference on Modern Circuits and Systems Technologies (MOCASST)*, 2021, pp. 1-4.

6. G. I. Orfanoudakis, E. Koutroulis, S. M. Sharkh and M. A. Yuratich, “Extended Boost PV inverter topology for the reduction of common-mode leakage current in three-phase applications”, *22nd European Conference on Power Electronics and Applications (EPE'20 ECCE Europe)*, Lyon, France, 2020, pp. 1-10.
7. G. I. Orfanoudakis, S. M. Sharkh and M. A. Yuratich, “Positive-sequence flux estimator based on Second-Order Generalized Integrators for grid synchronization and motor control under imbalanced conditions”, *21st European Conference on Power Electronics and Applications (EPE '19 ECCE Europe)*, Genova, Italy, 2019, pp. 1–10.
8. G. I. Orfanoudakis, E. Koutroulis, S. M. Sharkh and M. A. Yuratich, “Single-phase transformerless PV inverter topology with ac bypass and mid dc-link voltage clamping”, *19th European Conference on Power Electronics and Applications (EPE 2017)*, 11–14 September 2017, Warsaw, Poland.
9. D. Papastefanakis, G. Orfanoudakis and K. Siderakis, “Designing the grid protections to accommodate distributed generation”, *11th International Conference on Deregulated Electricity Market Issues in South Eastern Europe (DEMSEE'16)*, 22-23 September 2016, Heraklion, Crete, Greece.
10. V. Kantere, G. Orfanoudakis, A. Kementsietsidis, and T. Sellis, “Query Relaxation across Heterogeneous Data Sources”, *24th ACM International Conference on Information and Knowledge Management (CIKM '15)*. 2015. ACM, New York, NY, USA, 473-482.
11. G. I. Orfanoudakis, S. M. Sharkh and M. A. Yuratich, “Capacitor size reduction for multiple inverter systems”, *IET Conference on Renewable Power Generation (RPG 2011)*, 6 – 8 September 2011.
12. G. I. Orfanoudakis, S. M. Sharkh and M. A. Yuratich, “Circuit for reducing devices voltage stress due to DC-link capacitor voltage ripple in a Neutral-Point-Clamped inverter”, *14th European Conference on Power Electronics and Applications (EPE 2011)*, 30 August – 1 September 2011.
13. G. I. Orfanoudakis, S. M. Sharkh and M. A. Yuratich, “Analysis of DC-link capacitor losses in three-level neutral-point-clamped and cascaded H-bridge voltage source inverters”, *IEEE International Symposium on Industrial Electronics (ISIE 2010)*, 4 – 7 July 2010.
14. G. I. Orfanoudakis, S. M. Sharkh, M. A. Yuratich and M. A. Abu-Sara, “Loss comparison of two- and three-level inverter topologies”, *5th IET International Conference on Power Electronics, Machines and Drives (PEMD 2010)*, 19 – 21 April 2010.

[Total citations until Sept. 2022 according to Google Scholar: 419, h-index: 7]

Patents

Jun. 2021	“Method and system for controlling downhole pumping systems” – Current control. (US 11035209 B2).
Oct. 2020	“Apparatus and methods to control electric motors” (WO 2020/198629 A1).
Sept. 2019	“Method and system for controlling downhole pumping systems” – Backspin control (WO 2019/183407 A1).
Aug. 2019	“Method and system for monitoring the condition of rotating systems” (WO 2019/147750 A2).
Aug. 2018	“SOGI-based integrator, PLL and current controller for grid connection and motor control” (WO 2018/157120 A1).

Certifications

Sept. 2013	PRINCE2 Project Management - Practitioner (APMG).
May 2013	Management training - Ashorne Hill Chartered Management Institute (CMI).

Memberships

IEEE	Member of the IEEE and its Power Electronics society (PELS).
TEE-TCG	Member of the Technical Chamber of Greece.

Honours and Awards

2014	Nomination for “Knowledge Transfer Partnership (KTP) Awards 2014”.
2008 – 2012	PhD Scholarship from the Engineering and Physical Sciences Research Council (EPSRC).
2007 – 2008	MSc Scholarship – Lanchester Scholarship, University of Southampton.
1995 – 1999	4 Prizes and Distinctions in mathematical competitions of the Hellenic Mathematical Society.

Languages

Greek	Native
English	Fluent, Full professional proficiency (lived in the UK 2007 – 2014) TOEFL (score 107/120) Certificate of Proficiency in English (CPE), University of Cambridge Certificate of Proficiency in English (CPE), University of Michigan
French	Semi-fluent DELFI (A1, A2, A3, A4) DELFI (A5, A6)

Interests

Byzantine music – chanting	Obtained a Byzantine music degree in 2018.
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