Sahin Gullu

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Education

University of Central Florida, Orlando, FL, USA **May *2024***
Ph.D. in Electrical Engineering GPA 3.55

Florida Institute of Technology, Melbourne, FL, USA ***Dec 2017***
Master of Science in Electrical Engineering GPA 4.0

Bulent Ecevit University, Zonguldak, Turkey ***June 2013***
Bachelor in Electrical and Electronics Engineering GPA 3.54

Experience

The University of Central Florida, Orlando, FL, USA ***Aug 2018 - May 2024***

GTA – Graduate Teaching Assistant
- EEL 4914 Senior Design
- EEL 3926L Junior Design
- EEL 3342C Digital Systems
- EEL 3123C Linear Circuit II

Project – Grid-Forming (GFM) Inverters Control Techniques on Grid-tied and Off-grid Systems
- Applying enhanced droop control to form an islanding mode or grid-tied cases.
- Frequency controlled by controlling active power, voltage controlled by reactive power.
- Droop coefficient for frequency and voltage control 1% and 2%, respectively.
- Same power-rating inverters and different power-rating inverters simulated MATLAB Simulink.
- In heavy load, power needed for load taken from Grid in case of inverters insufficient.
- In light load, Grid, one or two inverters turned off to increase lifetime of inverters.

Project – Advanced Systems Integration of High-Power Inverter & High-Energy Battery Storage
- 540 KVA three-phase bidirectional inverter – 600V AC & 1500V DC – three 180 KVA inverters.
- 1.86 MWh (1400Ah) Lithium Iron Phosphate battery energy storage system – five 372 kWh (280 Ah) battery pods – eight 46.5 kWh (280Ah) battery module in each pod.
- Partnership of University of Central Florida and A.F. Mensah Inc. at Florida Solar Energy Center
- Designed power management control algorithm to reduce energy consumption.
- Operated in practice Peak Shaving and Load Shifting.
- Assessed and simulated eight different power flow scenarios in MATLAB.
- Analyzed technoeconomic impact in case of PV integration.

Project – Battery Management System for Integrated PV, Microinverter and Battery
- Simulated optimum battery size for integrated system in MATLAB.
- Modeled Lithium-ion batteries using Equivalent Circuit Model.
- Estimated SOC & SOH with Ampere-Hour Integral and Model-Based Estimation Method.
- Analyzed finding model parameters in MATLAB.
- Designed the algorithm of Master Controller unit.
- Researched Adaptive Extended Kalman Filter and Thermal Management Strategies.
- Evaluated Temperature of PCM in integrated system.

Project - High Speed Transmission in Multi-mode Fiber by Exciting Fundamental Mode
- Designed Tapered Fiber in RSoft between Single-mode Fiber and MMF.
- Simulated High Speed Transmission from SMF to MMF in RSoft.
- Analyzed in MATLAB, 99% power in MMF in Fundamental Mode.
- Collected Impulse Response Measurement Experimentally in MMF.
- Researched Frequency Response of SMF and MMF.

Florida Institute of Technology, Melbourne, FL, USA ***Aug 2015 - Dec 2017***

Thesis - Comparison of Reference Signal Received Power Measurements between Cell Phone and Scanning Receiver in LTE

- Configured PCTEL SeeGull EX+ and Cell Phone
- Collected measurements with PCTEL SeeGull EX+ Receiver and Cell Phone
- Coded, displayed, analyzed, and compared measurements in MATLAB

Bulent Ecevit University, Zonguldak, Turkey ***Sept 2008 - June 2013***

Dissertation - Motors and Motor Drivers in Solar Powered Cars
- Designed Motor Driver with MATLAB and Proteus
- Assembled and tested Motor Driver using Proteus
- Published Dissertation at Bulent Ecevit University

Undergraduate Research/Projects
- Designed Solar Powered Car with AutoCAD
- Researched product Solar Panels
- Designed line follower and sumo robot with MATLAB and Proteus

Organizations
- Participated in Alternative Energy Vehicle Races, organized by TUBITAK, the Scientific and Technological Research Council of Turkey
- Participated in Innovation Week, organized by the Turkish Exporters Assembly
- Participated in International METU Robotics Days at Middle East Technical University

Elektral Inc. Company, Izmir, Turkey ***July - Aug 2012***

Electrical Engineer Intern
- Designed, assembled, and evaluated Walk Through Metal Detectors and Hand Metal Detectors with MATLAB
- Tested Ultrasonic Rat Repeller, Disco / Sound Noise Monitoring Device

A Telekom Company, Izmir, Turkey ***June - July 2011***

Electrical Engineer Intern
- Trained Basic Occupational Health & Safety, Electrical Works
- Collected data from towers.
- Diagnosed power, maintenance & fails issues.

Skills

Language
- Turkish
- English

Programs
- MATLAB
- EAGLE
- Fusion 360
- PSIM

Honors & Awards

- 2023-2024 Provost's Outstanding Graduate Teaching Assistant
- Best Graduate Teaching Assistant for 2022-2023 Academic Year
- Best Paper Awards in the 12th International Renewable Energy Congress, 2021
- Scholarship for graduate studies in the USA, The Ministry of National Education, 2013-2023
- Third in rankings at College of Engineering, Bulent Ecevit University, 2013
- Scholarship for bachelor's degree, the Higher Education Credit and Dormitory Institution of the Ministry of Youth and Sports, 2008-2013

Research Interests

- Photovoltaic Energy Systems
- Grid-Forming (GFM) Inverters Control Methods
- Battery Management System
- Converters and Inverters

Peer Review

- IEEE Transactions on Transportation Electrification
- Energy Systems – Springer
- Journal of Electrical Engineering – Sciendo
- IEEE Energy Conversion Congress & Expo

References

- Dr. Issa Batarseh, Professor, University of Central Florida, issa[dot]batarseh[at]ucf[dot]edu
- Dr. Mohamad Salameh, Engineer, Rivian, msalame1[at]hawk[dot]iit[dot]edu
- Amour Djaho, Laboratory Manager, Florida Solar Energy Center, amour[dot]djaho[at]fsec[dot]ucf[dot]edu

Publications

[1] **S. Gullu**, "Comparison of Reference Signal Received Power Measurements Between Cell Phone and Scanning Receiver in LTE," Florida Institute of Technology, Melbourne, 2017.

[2] F. Alaql, R. Rezaii, **S. Gullu**, M. T. Elrais and I. Batarseh, "A Switchable Rectifier-based LLC Resonant Converter for Photovoltaic Applications," 2021 IEEE Energy Conversion Congress and Exposition (ECCE), Vancouver, BC, Canada, 2021, pp. 2093-2098, doi: 10.1109/ECCE47101.2021.9595746.

[3] M. Safayatullah, S. Ghosh, **S. Gullu,** and I. Batarseh, "Model Predictive Control for Single-Stage Grid-Tied Three-Port DC-DC-AC Converter Based on Dual Active Bridge and Interleaved Boost Topology," IECON 2021 – 47th Annual Conference of the IEEE Industrial Electronics Society, Toronto, ON, Canada, 2021, pp. 1-6, doi: 10.1109/IECON48115.2021.9589546.

[4] **S. Gullu**, J. Phelps, I. Batarseh, K. Alluhaybi, M. Salameh and S. Al-Hallaj, "Smart Battery Management System for Integrated PV, Microinverter and Energy Storage," 2021 12th International Renewable Energy Congress (IREC), Hammamet, Tunisia, 2021, pp. 1-6, doi: 10.1109/IREC52758.2021.9624748.

[5] F. Alaql, R. Rezaii, A. Alhatlani, **S. Gullu**, M. Safayatullah and I. Batarseh, "Multi-Mode Rectifier-Based Dual-Input LLC Converter for Wide Voltage PV Applications," 2022 IEEE Energy Conversion Congress and Exposition (ECCE), Detroit, MI, USA, 2022, pp. 1-5, doi: 10.1109/ECCE50734.2022.9948025.

[6] **S. Gullu**, M. T. Elrais, I. Batarseh, M. Salameh and S. Al-Hallaj, "High Voltage Battery Management System Hardware and Software Design for Photovoltaic Energy Systems," 2022 IEEE 7th Southern Power Electronics Conference (SPEC), Nadi, Fiji, 2022, pp. 1-5, doi: 10.1109/SPEC55080.2022.10058391.

[7] **S. Gullu** et al., "Advanced Systems Integration of 540 KVA Inverter and 1.86 MWh Battery Energy Storage System for Microgrid Application: A Case Study," 2022 13th International Renewable Energy Congress (IREC), Hammamet, Tunisia, 2022, pp. 1-5, doi: 10.1109/IREC56325.2022.10002117.

[8] S. Ghosh, A. Alhatlani, **S. Gullu,** and I. Batarseh, "MPPT of Dual-PV LLC Converter Using Fuzzy ANFIS Hybrid Interface," 2022 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), Jaipur, India, 2022, pp. 1-6, doi: 10.1109/PEDES56012.2022.10080322.

[9] **S. Gullu**, I. Batarseh, M. Salameh and S. Al-Hallaj, "Optimized Photovoltaic Energy System for Tier 2 Electricity Access," 2023 IEEE Conference on Power Electronics and Renewable Energy (CPERE), Luxor, Egypt, 2023, pp. 1-6, doi: 10.1109/CPERE56564.2023.10119597.

[10] **S. Gullu**, A. Djaho, A. Mensah, and I. Batarseh "Case Study of 1.86 MWh BESS and 540 KVA Inverter Integration for Photovoltaic Based Microgrid Application," Computers & Electrical Engineering (Elsevier), England, 2023 (Submitted).

[11] M. Nilian, R. Rezaii, M. Safayatullah, **S. Gullu**, F. Alaql, and I. Batarseh, "A Three-port Dual Active Bridge Resonant Based with DC/AC Output," 2023 IEEE Energy Conversion Congress and Exposition (ECCE), Nashville, TN, USA, 2023, pp. 2537-2541, doi: 10.1109/ECCE53617.2023.10362035.

[12] **S. Gullu**, M. Nilian, and I. Batarseh, "Enhanced droop control for off-grid and grid-tied scenarios in renewable energy systems," International Journal of Energy Studies (IJES), e-ISSN: 2717-7513, Turkey, 2023 (Submitted).

[13] **S. Gullu**, I. Batarseh, and F. Alaql "Design and optimization of AC photovoltaic system," International Journal of Energy Studies (IJES), e-ISSN: 2717-7513, Turkey, 2024 (Submitted).