



Dr. Feras Alasali

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Education:

- **University of Reading**, Reading, U.K. PhD. in Electronic and Electrical Engineering (Degree of Specialty: Power electrical engineering), 2016-2019.
 - Thesis Title: Optimal Energy Controllers of Energy Storage Systems Based on Load Forecasting for RTG Cranes Network.
 - Supervisor: Prof. William Holderbaum.
- **Yarmouk University**, Irbid -Jordan. Master degree in Electrical power Engineering, Department of Electrical Engineering, 2009-2013.
- **Al-Balqa' Applied University**, Amman-Jordan. B.Sc. degree in Electrical power Engineering, Department of Electrical Engineering, 2002-2006.

Research Interests and Skills

My current research interest is focused in the area of electrical power systems, power protection systems, smart grid, load forecasting as well as control system and modelling of energy storage systems. These interests include protection and control of energy storage and power systems based on load forecasting. Recent areas have included:

- Emerging technologies and Optimization methods: Applying emerging technologies such as machine learning and optimization methods such as stochastic model predictive control and genetic algorithm to optimally simulate network loads and design protection systems for micro and smart grid and different engineering problems.
- Load Forecasting Modelling: Quantifying low voltage network demand uncertainty, developing different forecasts for network planning and management, and utilizing scenario forecasts to estimate the impact of using energy storage systems in the low voltage network.
- Renewable Energy and Smart grid: Utilizing emerging technologies, optimization and forecasting methodologies to optimize the control of renewable energy and energy storage resources for a smart grid network.
- Cyber-Physical Threats: evaluating the resilience of the power and smart grids under cyber-physical threats. This will help to develop a more robust smart grid system and improves the security requirements, protocols, architectures and response of the system to ongoing attacks.

Teaching Interests

I attempt to instill a sense of enthusiasm in my students by relating course material to both cutting-edge research and the actual world. I've taught fundamental courses in circuit analysis and engineering mathematics.

- Renewable energy.
- Power conversion.
- Smart grid.
- Power system protection.
- Electrical machine.
- Power system analysis.
- Electrical circuits theory.
- Load forecasting.
- Control theory.
- Electrical and Electronic circuits lab.
- Simulation software (MATLAB, Etap, pspice).
- Supervising Master thesis.
- Supervising final year projects, Building prototypes, Measurements and Calibration.

Work and Professional Experience:

- September 2020 – present, Director of Renewable Energy Center, The Hashemite University, Jordan. The main responsibilities:
 - Supervising and maintaining the productivity of the university's solar energy system (5 MW PV power systems).
 - Implementing and managing smart metering systems to monitor and optimize energy consumption within the university, promoting energy efficiency and cost savings.
 - Conducting energy audits for local industries and corporations to identify energy-saving opportunities and provide recommendations.
 - Developing and delivering training programs for professional on designing, monitoring, and maintaining renewable energy systems, as well as improving their efficiency.
 - Providing guidance and support to students and professional working on projects related to renewable energy, including research projects and practical applications.
 - Promoting and facilitating scientific research in the field of renewable energy.
 - Offering laboratory services and consultancy in renewable energy impact assessment and auditing, assisting organizations in evaluating their energy consumption and environmental impact.
 - Coordinating and organizing training courses, seminars, workshops, public lectures, and field visits related to energy, aiming to enhance knowledge and awareness in the field of renewable energy.
 - Keeping up-to-date with advancements in renewable energy technologies, policies, and industry trends, and incorporating relevant information into center activities and curriculum development.
 - Participating in research and development initiatives to advance the integration of cybersecurity measures within smart grid and renewable energy technologies, contributing to the development of secure and reliable energy monitoring systems.
 - Preparing tenders specifications related to renewable energy projects, smart metering systems, energy auditing and cyber-physical threats ensuring compliance with procurement regulations and evaluating technical proposals and bids.
- September 2019 – present, Assistant Professor, Department of Electrical engineering, The Hashemite University, Jordan.
- June 2019 until June 2021, Visiting Researcher, University of Reading, UK.
- September 2015 until June 2019, Assistant Researcher, University of Reading, UK.
- December 2013 until September 2015, Project Manager in Al-Gihaz Co. for HV /MV substation 110/13.8 KV Saudi Arabia.
- October 2007 until September 2013, Protection and metering engineer, Electricity Distribution Company [EDCO].

Selected Publication:

Book

- Holderbaum, W.; **Alasali, F.**; Sinha, A. Energy Forecasting and Control Methods for Energy Storage Systems in Distribution Networks. *Springer Cham, Switzerland*, Edition 1, 2023, p. XVI- 204, <https://doi.org/10.1007/978-3-030-82848-6>.

Journal

- Tawalbeh, R.; **Alasali, F.**; Ghanem, Z.; Alghazzawi, M.; Abu-Raideh, A.; Holderbaum, W. Innovative Characterization and Comparative Analysis of Water Level Sensors for Enhanced Early Detection and Warning of Floods. *J. Low Power Electron. Appl.* 2023, 13, 26. <https://doi.org/10.3390/jlpea13020026> (open access)
- **Alasali, F.**; Saidi, A.S.; El-Naily, N.; Smadi, O.; Khaleel, M.; Ghirani, I. Assessment of the impact of a 10-MW grid-tied solar system on the Libyan grid in terms of the power protection system stability. *Clean Energy* 2023, 7 (2), 389-407, (open access).
- **Alasali, F.**; Saidi, A.S.; El-Naily, N.; Smadi, M.A.; Holderbaum, W. Hybrid Tripping Characteristic-Based Protection Coordination Scheme for Photovoltaic Power Systems. *Sustainability* 2023, 15, 1540. <https://doi.org/10.3390/su15021540>, (open access).
- **Alasali, F.**; Saidi, A.; El-Naily, N.; Alnaser, S.; Holderbaum, W.; Saad, S.; Gamaledin, M. Advanced Coordination Method for Overcurrent Protection Relays Using New Hybrid and Dynamic Tripping Characteristics for Microgrid. *IEEE Access* 2022, 10.1109/ACCESS.2022.3226688, (open access).
- Zarour, E.; **Alasali, F.**; Alsmadi, O.; El-Naily, N. A new adaptive protection approach for overcurrent relays using novel nonstandard current-voltage characteristics. *Electric Power Systems Research* 2023, 216, 109083.
- **Alasali, F.**; Zarour, E.; Holderbaum, W.; Nusair, K. Highly Fast Innovative Overcurrent Protection Scheme for Microgrid Using Metaheuristic Optimization Algorithms and Nonstandard Tripping Characteristics. *IEEE Access*, 2022, 10.1109/ACCESS.2022.3168158, (open access).

- **Alasali, F.**; Nusair, K.; Foudeh, H.; Holderbaum, W.; Vinayagam, A.; Aziz, A. Modern Optimal Controllers for Hybrid Active Power Filter to Minimize Harmonic Distortion. *Electronics* 2022, 11, 1453. <https://doi.org/10.3390/electronics11091453>, (open access).
- Nusair, K.; **Alasali, F.**; Holderbaum, W.; Vinayagam, A.; Aziz, A. High Hybrid Power Converter Performance Using Modern-Optimization-Methods-Based PWM Strategy. *Electronics* 2022, 11, 2019. <https://doi.org/10.3390/electronics11132019>, (open access).
- **Alasali, F.**; Salameh, M.; Semrin, A.; Nusair, K.; El-Naily, N.; Holderbaum, W. Optimal Controllers and Configurations of 100% PV and Energy Storage Systems for a Microgrid: The Case Study of a Small Town in Jordan. *Sustainability* 2022, 14, 8124. <https://doi.org/10.3390/su14138124>, (open access).
- Abeid, S.; Hu, Y.; **Alasali, F.**; El-Naily, N. Innovative Optimal Nonstandard Tripping Protection Scheme for Radial and Meshed Microgrid Systems. *Energies* 2022, 15, 4980. <https://doi.org/10.3390/en15144980>. (open access).
- El-Naily, N.; Saad, S.; Elhaffar, A.; Zarour, E., **Alasali, F.** Innovative Adaptive Protection Approach to Maximize the Security and Performance of Phase/Earth Overcurrent Relay for Microgrid Considering Earth Fault Scenarios. *Electric Power Systems Research*, 2022, 206, 107844.
- **Alasali, F.**; Saad, S.; El-Naily, N.; Layas, A.; Elhaffar, A.; Hussein, T.; Mohamed, F. Application of Time-Voltage Characteristics in Overcurrent Scheme to Reduce Arc-Flash Incident Energy for Safety and Reliability of Microgrid Protection. *Energies*, 2021, 14(23), 8074, (open access).
- Nusair, K.; **Alasali, F.**; Hayajneh, A.; Holderbaum, W. Optimal placement of FACTS devices and power-flow solutions for a power network system integrated with stochastic renewable energy resources using new metaheuristic optimization techniques. *International Journal of Energy Research*, 2021, DOI: 10.1002/er.6997.
- **Alasali, F.**; Nusair, K.; Obeidat, A.; Foudeh, H.; Holderbaum, W. An analysis of optimal power flow strategies for a power network incorporating stochastic renewable energy resources. *International Transactions on Electrical Energy Systems*, Wiley 2021, <https://doi.org/10.1002/2050-7038.13060>
- **Alasali, F.**; Tawalbeh, R.; Ghanem, Z.; Mohammad, F.; Alghazzawi, M. A Sustainable Early Warning System Using Rolling Forecasts Based on ANN and Golden Ratio Optimization Methods to Accurately Predict Real-Time Water Levels and Flash Flood. *Sensors*, 2021, 21, 4598, <https://doi.org/10.3390/s21134598>, (open access).
- **Alasali, F.**; Foudeh, H.; Ali, E.M.; Nusair, K.; Holderbaum, W. Forecasting and Modelling the Uncertainty of Low Voltage Network Demand and the Effect of Renewable Energy Sources. *Energies*, 2021, 14, 2151. <https://doi.org/10.3390/en14082151>, (open access).
- **Alasali, F.**, Nusair, K., Alhmoud, L. and Zarour, E. Impact of the COVID-19 Pandemic on Electricity Demand and Load Forecasting. *Sustainability*, 2021, 13, 1435, (open access).
- **Alasali, F.**; El-Naily, N.; Zarour, E.; Saad, S. Highly Sensitive and Fast Microgrid Protection Using Optimal Coordination Scheme and Nonstandard Tripping Characteristics. *International Journal of Electrical Power and Energy Systems*, 2021, 128, 106756.
- Nusair, K.; **Alasali, F.** Optimal Power Flow Management System for a Power Network with Stochastic Renewable Energy Resources using Golden Ratio Optimization Method. *Energies*, 2020, 13, 3671, (open access).
- Pietrosanti, S.; **Alasali, F.**; Holderbaum, W. Power Management System for RTG Crane Using Fuzzy Logic Controller. *Sustainable Energy Technologies and Assessments*, 2020, 37, 10063.
- **Alasali, F.**; Haben, S.; Foudeh, H.; Holderbaum, W. A Comparative Study of Optimal Energy Management Strategies for Energy Storage with Stochastic Loads. *Energies*, 2020, 13, 2596, (open access).
- **Alasali, F.**; Haben, S.; Holderbaum, W. Energy management systems for a network of electrified cranes with energy storage. *International Journal of Electrical Power and Energy Systems*, 2019, 106, pp 210-222.
- **Alasali, F.**; Haben, S.; Holderbaum, W. Stochastic Optimal Energy Management System for RTG Cranes Network Using Genetic Algorithm and Ensemble Forecasts. *Journal of Energy Storage*, 2019, 100759.
- **Alasali, F.**; Luque, A.; Mayer, R.; Holderbaum, W. A Comparative Study of Energy Storage System and Active Front End for Network of two electrified RTG cranes. *Energies*, 2019, 12, 1771, (open access).
- **Alasali, F.**; Haben, S.; Becerra, V.; Holderbaum, W. Day-ahead industrial load forecasting for electric RTG cranes. *Journal of Modern Power Systems and Clean Energy*, 2018, 6, pp. 223- 234, (open access).
- **Alasali, F.**; Haben, S.; Becerra, V.; Holderbaum, W. Optimal energy management and MPC strategies for electrified RTG cranes with energy storage systems. *Energies*, 2017, 10, (open access).

Conferences

- Aldalameh, S.; Hayajneh, A.; **Alasali, F.** Power Load Estimation in Smart Grids via k-Means Clustering using Sensor Networks. IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT), Amman, Jordan, 2023.
- **Alasali, F.**; Zarour, E.; AL-Hayajneh, A.; Alsamadi, O. Optimal Protection Coordination Scheme of Overcurrent Relays for Microgrid System. *IEEE International Conference on Renewable Energy Research and Application*, Turkey, 2021.

- Saad, S.; **Alasali, F.**; El-Naily, N.; Elhaffar, A.; Hussein, T.; Mohamed, F. Coordination of Mixed Overcurrent and voltage-Restrained Overcurrent Relays to Avoid Miscoordination Problems Considering IEC time-Current Curve Limitations. *IEEE International Renewable Energy Congress*, Tunisia, 2021.
- Ali, E.; Yahaya, N.; Al Assaf, A.; **Alasali, F.**; et al. Analysis and Maximizing RF Harvesting System based on Antenna Shapes for Aviation Applications. *IEEE- CEECT*, Melbourne- Australia, 2020.
- **Alasali, F.**; Becerra, V.; Holderbaum, W. Peak power reduction for electrified Rubber-Tyred Gantry (RTG) cranes using energy storage. 8th International Symposium on Automatic Control - AUTSYM, Germany, 2017.
- **Alasali, F.**; Haben, S.; Becerra, V.; Holderbaum, W. Analysis of RTG Crane Load Demand and Short-term Load Forecasting. International Congress on Advances in Engineering and Technological Developments conference, London, 2016.
- Luque, A.; **Alasali, F.**; Holderbaum, W.; Becerra, V.; et al. Energy reduction on eRTG. IEEE 16th International Conference on Environment and Electrical Engineering (EEEIC), Florence, 2016.

Funded Projects

- **Project title:** Flood Forecasting and Early Warning System in Jordan, **August 2020- August 2021**
 - **Project group:** Dr. Feras Alasali (**investigator**), Dr. Rula Tawalbeh, Eng. Zahra Alsaleh
 - **Source:** UNICEF, Bassmati Innovation Community's , **Budget:** 20000 USD.
 - **Abstract:** This project focused on employing remote monitoring sensor systems for flash flood prediction. Dr. Alasali's team developed an Early Flood Warning System (EFWS) using a unique rolling forecast model based on Artificial Neural Network (ANN) and Golden Ratio Optimization (GROM) methods. The goal was to provide decision-makers with reliable and accurate information about potential flood events in a timely manner. The project successfully improved the accuracy of the forecasting model by 40% compared to traditional ANN models, and by 93.5% compared to fixed forecast models.
- **Project title:** Analyzing Smart Grid Resilience Under Cyber-Physical Threats, **January 2023-January 2025**
 - **Project group:** Dr. Feras Alasali (**investigator**), Dr. Anas Almajali, Dr. Ali Hayajneh, Prof. Awni Itradat
 - **Source:** Ministry of Higher Education and Scientific Research - Jordan, Scientific Research and Innovation Support Fund, **Budget:** 132000 USD.
 - **Abstract:** Our initiative is centered on assessing the resilience of smart grids to a variety of cyber-physical threats at High Voltage (HV), Medium Voltage (MV), and Low Voltage (LV) levels. We are using simulations to study different threat scenarios and their impacts on the power protection system, particularly at HV/MV levels, while also addressing the often underappreciated threats on LV networks. The ultimate goal is to enhance the power grid's resilience at all voltage levels, leading to the development of a more robust cybersecurity strategy for the energy sector. Further information is available at <https://cyberssgridhu.github.io/>

Editor and Reviewer:

Editor

- Special Issue intitled " Energy Efficiency", Frontiers in Energy research. This special issue belongs to the section " Smart Grids ".
- Special Issue intitled "New Trends in Smart Power Grid Energy Management", Energies (ISSN 1996-1073). This special issue belongs to the section "A5: Smart Grids and Microgrids".
- Special Issue intitled "Design, Modelling and Application of Electronics in Power Systems", Electronics (ISSN 2079-9292). This special issue belongs to the section "Industrial Electronics".
- Special Issue intitled " Smart Grid and Optimization-Based Scheduling of Power Systems", Energies (ISSN 1996-1073). This special issue belongs to the section " Smart Grids and Microgrids".

reviewer

- Since 2021: IEEE, Canadian Journal of Electrical and Computer Engineering.
- Since 2021: Soft Computing.
- Since 2019: The International Journal of Power and Energy Systems.
- Since 2019: eTransportation Journal.
- Since 2019: Journal of Energy Storage.
- Since 2019: IEEE Access.
- Since 2019: Electronics.
- Since 2019: sustainability.
- Since 2019: Energy.
- Since 2018: Applied sciences.
- Since 2018: Energies.
- Since 2018: Processes.
- Since 2017: Journal of Modern power Systems and Clean Energy.

Awards:

- Honorary Diploma for achieving the Finalist of 3rd KANS Scientific Competition, in Recognition of Outstanding Work Titled “A Sustainable (solar-powered) Early Flood Warning System Using Rolling Forecasts Based on Artificial” in “Electronics & Robotics” Field.
- The best graduation student project in Jordan 2022 by Jordan Engineers Association
- (2015-2019) Hashemite University of Jordan sponsorship for 4 years for PhD in the University of Reading, UK, covering tuition fees and monthly allowances.
- Best Reviewer Prize 2018, Journal of Modern power Systems and Clean Energy.
- Best conference paper, International Congress on Advances in Engineering and Technological Developments conference, 2016.
- Young Engineer Prize 2013 by Jordan Engineers Association.

Membership:

- Membership in Institute of Electrical and Electronics Engineers (IEEE).
- Membership in IEEE PES Professionals.
- Membership in Jordan Engineers Association.
- Membership in Saudi Council of Engineers.
- Involvement in International Conferences, organization and review process.
- Invited Lectured/Seminars (University of Reading and Aston University)
- Industrial Collaborations (SAM engineering , Electrical distribution company, Port of Felixstowe)
- Academic Collaborations (University of Reading and Aston University).

Training Courses:

- Green Hydrogen and Power -to-X Training for Academic Staff, German Jordanian University, Jordan, 5-6/7/2023
- Green Hydrogen, German Energy Solutions Initiative, Jordan, 7-11/5/2023
- “How to prepare proposal for capacity building in the field of youth” from Erasmus (Jordan office), 12/2022.
- “Shiraka Energy Transition Training Industry 2022,” A Shiraka professional development course over two weeks funded by Clingendael and Netherlands Institute of International Relations, 2022
- “Applied Photovoltaic Systems” from SEED and Jordan Engineering Association, 2020.
- “Higher Education” which was held in deanship of academic development and international outreach at The Hashemite University, 2020.
- Creative thinking and problem solving, Reading, UK, 2017.
- Doctoral Research Conference, Reading, UK, 2017.
- Intermediate/Advanced LaTeX, Reading, UK, 2016.
- An introduction to LaTeX, Reading, UK, 2016.
- Doctoral Research Conference Reading, UK, 2016.
- An Introduction to Protective Relay Testing using the CMC 256 from OMICRON Academy.
- CYME 5.0 Training Sessions from CYME International T&D.
- ABB Relay (Ref 610, ref542+, REX521, Spaj relay) from ABB LTD in Jordan.
- DIGSI Software & (SIPROTEC Family) From Ketaneh The local agent of the Siemens in Jordan.
- SCADA System SIMATIC WinCC from Jordan Engineering Association.
- Portable Meter Test Equipment; MTE Company; Germany.
- Stationary Meter Test Bench; ZERA Company; for one week in Germany.
- ELSTER Static Meters (PMU Programming Software) for two training days in Amman-Jordan
- ISKRA Static Meters (METERVIEW Programming Software) for one week in Slovenia.
- PMP (Project manager Professional) training in Amman-Jordan.
- Primavera project planner in Amman-Jordan.
- Introduction of ISO for one training day in Amman-Jordan.
- Uncertainty of measurement & verification of electrical measuring equipment in Amman-Jordan

