Hani Muhsen

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Dr. Hani Muhsen is an Associate Professor in Mechatronics Engineering department at German Jordanian University. He held several administrative positions such as Exchange coordinator of Mechanical Engineering, Dean Assistant for Quality Assurance, and currently an Exchange Coordinator of Mechatronics Engineering. The interest of Dr. Muhsen focused on Electrical Engineering field, Renewable energy, Smart grid, and design optimization. Dr. Muhsen published more than 12 papers in international Journals and conference proceedings.

LINKS

Websites:

LinkedIn: https://www.linkedin.com/in/dr-enghani-muhsen-9b011060/
ResearchGate: http://https://www.researchgate.net/ profile/H_Muhsen/publications
Google Scholar: https://scholar.google.com/citations?user=ti6N2R4AAAAJ&hl=en&oi=ao%20

EDUCATION

Palestine Polytechnic University
Sep 2000-June 2005

BACHELOR of ENGINEERING/Electrical Engineering/ Industrial Automation Engineering

• **GPA**: 87.6% (Excellent)
• **Major**: Electrical Engineering
• **Minor in Subject**: Industrial Automation Engineering
• Top Student (Rank 1) in B.Eng
• Excellence scholarship from the university

Jordan University of Science and Technology
Sep. 2006-Oct. 2009

MASTER OF SCIENCE/Electrical Engineering

• **Major**: Electrical Engineering
• Top 10% of Class
• **GPA**: 83.6 (Very Good)
• **Thesis**: TAGUCHI'S OPTIMIZATION METHOD AND ITS APPLICATION TO THE DESIGN OF ANTENNAS
• **Publications**: Dib, Nihad I., Sotirios K. Goudos, and Hani Muhsen. Application of Taguchi's optimization method and self-adaptive differential evolution to the synthesis of linear antenna arrays." Progress In Electromagnetics Research 102 (2010): 159-180.
• **Scholarships**: Full DAAD scholarship for M.Sc. Study.

Technical University of Chemnitz
Feb. 2013- Mar. 2016

DR.ENG./ Electrical Engineering and Information Technology

• **Major**: Electrical Engineering and Information Technology
• With Honors
• **Scholarships**: Full DAAD scholarship for PhD study
• **Publications**:

1. H. Muhsen, J. Lutz and S. Hiller, "Design and Evaluation of Gate Drivers of SiC MOSFET," Proceedings of PCIM Europe 2015; International Exhibition and Conference for Power Electronics, Intelligent Motion, Renewable Energy and Energy Management, Nuremberg, Germany, 2015, pp. 1-8.

2. S. Frankeser, H. Muhsen and J. Lutz, "Comparison of drivers for SiC-BJTs, Si-IGBTs and SiC-MOSFETs," Proceedings of PCIM Europe 2015; International
Exhibition and Conference for Power Electronics, Intelligent Motion, Renewable Energy and Energy Management, Nuremberg, Germany, 2015, pp. 1-9.

3. Hani Muhsen and S. Hiller, "A New Simplified Space Vector PWM Scheme for Two-Level Voltage Source Inverter," Proceedings

of PCIM Europe 2015;
International Exhibition and Conference for Power Electronics, Intelligent Motion, Renewable Energy and Energy Management, Nuremberg, Germany,
2015, pp. 1-7.
4. H. Muhsen, S. Hiller and J. Lutz, "Three-phase voltage source inverter using SiC MOSFETs — Design and Optimization," 2015 17th European
Conference on Power Electronics and Applications (EPE'15 ECCE-Europe), Geneva, 2015, pp. 1-9, doi: 10.1109/EPE.2015.7309466.
5. H.Muhsen, S. Hiller, "A NEW STRATEGY FOR COMPENSATING THE DEAD-TIME IN CARRIER BASED PWM," 18th INTERNATIONAL SYMPOSIUM on POWER ELECTRONICS - Ee 2015 NOVI SAD, SERBIA, October 28th - 30th, 2015
- **Dissertation**: Three-Phase Voltage Source Inverter with Very High Efficiency Based on SiC Devices

EXPERIENCE

Palestine Polytechnic University
Sep 2005 - Sep 2006

Teaching and Research Assistant

Teaching Electrical Engineering Courses and Labs for Diplom Students.

Wadi Alseer Technical College
Sep 2008 -July 2010

Lecturer

Teaching Electrical Engineering Courses and Labs for Diplom Students.

Tabuk University
Aug 2010 - Aug 2011

Lecturer

Teaching Electrical Engineering Courses and Labs for Bachelor Students

German Jordanian University
Oct 2016 - Present

Assistant Professor

Teaching Mechatronics Students, Electrical Machines, PLC, Modeling and Simulation, Instrumentation and Measurements, Supervising Graduation Projects. Research Conduction.

German Jordanian University
Feb 2017 - Oct 2017

Exchange Coordinator of Mechanical Engineering

Initialization and Finalization of Learning Agreement for exchange students. Supervsing Exchange Students. Networking with German Partners.

German Jordanian University
Oct 2017 - Sep 2018

Dean's Assistant for Quality Assurance

Preparing SOPs for the School of Applied Technical Sciences. Supervising and Helping the filling of course Portfolios.

German Jordanian University
Sep 2018 - Sep 2020

Exchange Coordinator of Mechatronics Engineering

Initialization and Finalization of Learning Agreement for exchange students. Supervising Exchange Students. Networking with German Partners.

German Jordanian University
July 2021 - Present

Associate Professor

Teaching Mechatronics Students, Electrical Machines, PLC, Modeling and Simulation, Instrumentation and Measurements, Supervising Graduation Projects. Research Conduction.

German Jordanian University
Sep 2021 - Present

Vice Dean of Deanship of Students Affairs

LANGUAGES

Arabic (Native), **English** (Full professional proficiency), **German** (C1)

SKILLS

Electrical Engineering, Time management, Information Technology, Design Optimization, Renewable Energy, Smart Grid.

MEMBERSHIP

2007-Present

JEA Member (Jordan Engineers Association)

2017-Present

IEEE PELS (Power Electronics Society)

2016-Present

IEEE Member

CERTIFICATIONS, AWARDS, SCHOLARSHIP

Certified Consultant ISO 9001:2015
Mar 2018

American Institute of Professional Studies

Master Scholarship
Sep. 2006

DAAD

PhD Scholarship
Apr 2011

DAAD

Returning Expert Award
Oct 2017

GIZ

TEACHING

German Jordanian University

Electrical Machines, Electrical Machines Lab, Instrumentations and Measurements, Instrumentation and Measurements Lab, Special Topics in Electrical and Electronics Engineering, Programmable Logic Controllers, Programmable Logic Controllers Lab, Modeling and Simulation.

ATTENDED COURSES

Certified Quality Management System Consultant
Nov 2017

American Institute of Professional Studies

Sustainable Development Through Effective Knowledge Sharing Effective
Feb 2018

GIZ

Arab Artificial Intelligence Summit 2019
Oct 2019

Phi Science Institute

Trojan Battery And Studer Off Grid Inverters And Chargers Technical Training
Jul 2019

Hydroturf Energy

Smart Grid 1
Feb 2019

University of Cyprus

Smart Grid 2
Sep 2019

Newcastle University

Getting Started: Designing Online Learning
Sep 2020

Oxford University Press

Taking It Further: Developing the Online Learning Experience
Oct 2020

Oxford University Press

Feedback and Assessment
Sep 2020

Oxford University Press

Supporting Your Students: Engagement, Inclusivity and Wellbeing
Sep 2020

Oxford University Press

Energy Trading/Exchange in A Neighborhood/Digitization
Sep 2020

Middle East University

OP-101: Fundamentals of Real-Time Simulation with RT-LAB
Dec.2020

OPAL-RT Technologies

OP-203: Real-Time Simulation of Power Systems with ARTEMiS
Dec. 2020

OPAL-RT Technologies

COMMITTEES

University Council
Oct. 2021-Sep-2022

German Year Committee
Sep 2018 - Sep 2020

Discussing and proposing new rules and solutions for rising problems related to the German Year

Disciplinary Committee at University Level
Oct 2019 - Present

Solving the problem dispute and investigating the truth and proposing punishments for the students.

SATS Annual Report
Oct 2016 - Oct 2017

Create the first comprehensive school annual report •The report included unprecedented school academic and research statistics and analysis using 3 years data •The prepared report paved the road for subsequent annual reports in terms of format and content

Quality Assurance Committee
Feb 2017 - Oct 2017

To establish SOPs for the mechatronics department

School Council
Oct 2019 - Present

4th Year Committee for German Year
Feb 2017 - Oct 2020

To discuss the issues of the German Year for 4th year students

Mechatronics Study Plan Committee
Oct 2018 - Oct 2019

To prepare the academic Plan for 2020

ACTIVITIES AND INVITED TALKS

German Jordan University
Dec. 2019

Preparing and Conducting A Workshop on Smart Grid and Grid Integration of Renewable Energy Systems

Middle East University
Jan 2019

Preparing and Conducting A Workshop on Smart Grid Technology for Jordanian Stakeholders

Jordan University
Sep 2020

Trainer in Online Training Workshop for Students In The Frame Of The Erasmus Plus Program Egreen Project Number: 573927-EPP-1-2016-1-JOEPPKA2-CBHE-JP

Arab Union for Sustainable Development and Enivroment
Dec. 2020

Invited Talk for Innovations in Renewable Energy Resources: Smart Grid Technology

INTERNATIONAL ACTIVITIES

Reviewer for Advances in Science, Technology and Engineering Systems Journal (ASTESJ)

15.12.2020- Until Now

Reviewer for ICRIE2020 Conference

2020

Duhok, Kurdistan

Reviewer for INTELEC 2017 Conference

Queensland, Australia

Technical Committee of Special Session "Advancements for ISAECT 2020 Conference

Kenitra, Morocco

Publication Chair for IREC2021 Conference

Amman, Jordan

Special Training Session on Smart Grid Technology for The Syrian Universities

Feb. 2020

Amman, Jordan

GRANTS AND FUNDED PROJECTS

Advanced Teaching and Training on Smart Grid and Grid Integration of Renewable Energy Systems

Nov 2017 - Jul 2021

http://www.meu.edu.jo/sites/atsgires/

Erasmus+ Capacity Building Project
Budget: 999,000.00 Euros

Engineering-Based Economical Evaluation of The Retired Li Ion Batteries From Electric And Hybrid-Electric Vehicles

Aug 2018 - Dec 2020

DGSSR/ GJU
Budget: 49270 JD

Modeling and Simulation Distributed Energy Resources in Smart Grid: Management and Optimization

Feb.2021 - Feb.2023

DGSSR/ GJU
Budget: 25460 JD

Digital Twin Software to Control Part of Jordanian Electrical Networks with Considering the Cyber-security Aspect

April.2021 - April.2023

Royal Academy of Engineering

Transforming Systems through Partnership 20/21
Budget: 80,000.0 pound sterling

PUBLICATIONS

Competencies of Fault Ride Through in Microgrid Modeling: A Case Study

Accepted Oct.2021

IEEE

Analysis and Simulation of Maximum Power Point Tracking Based on Gradient Ascent Method

April.2021

IEEE

This paper aims to implement the gradient ascent algorithm for maximum power point tracking (MPPT) in a photovoltaic (PV) system. The proposed MPPT algorithm will ensure the PV module's operation at the maximum power point by finding the optimal duty cycle that corresponds to each time step. The gradient ascent algorithm is an iterative method, and it is one of the most popular machine learning optimization algorithms. The gradient ascent is used for the first-order optimization, which means it only takes the first derivative into account when doing the parameter updates. On each iteration, the parameters have been changed in the opposite direction of the objective function gradient. Steps proportional to the positive gradient have been

applied to find a local maximum of the function. This function has been implemented in a PV model to investigate the gradient ascent algorithm's applicability as an MPPT algorithm under various conditions.

Algorithm Design for Accurate Steps Counting Based on Smartphone Sensors for Indoor Applications

Abstract: this paper aims to design an accurate and robust algorithm for counting the steps based on the smartphone's accelerometer for indoor applications. Different daily activities have been considered in the experimental scenarios, including normal walking with various smartphone positions and running activities. The detection process's accuracy is ensured by setting an appropriate segregation approach and defining a fixed threshold for each experiment. The algorithm generates a new envelope signal that mimics the collected steps signal without the vibrations and noise elements to avoid miscounting the exact steps. The followed approach results have been compared with the pedometer applications on the android platform and HUAWEI Watch GT-731. The proposed algorithm showed improved detection accuracy in contrast to the other literature approaches. The obtained accuracy was around 99% for the standard walking scenario and approximately 97% for the running activity scenario.

Optimal PV Size and Location to Reduce Active Power Losses While Achieving Very High Penetration Level with Improvement in Voltage Profile Using Modified Jaya Algorithm

Abstract: In this article, a new multiobjective algorithm is proposed for determining the optimal sizing and allocation of the photovoltaic (PV) systems in radial distribution systems. A Jaya algorithm is modified to find the optimal PV capacities for limited bus locations at the network. The proposed algorithm showed better performance against known techniques, and the results are presented. Besides, a new distinguished methodology is improved and developed based on the Jaya Algorithm to find the optimum capacity of each PV system that satisfies an improvement of the voltage profile and reduces power losses under high penetration levels. Also, optimum capacities are determined by considering the connection of the PV systems for all buses along with the network. Furthermore, the proposed method is verified on the standard IEEE-33 bus test system with high penetration rates. Simulation and validation are obtained by MATPOWER and OCTAVE software.

Small Wind Turbine Blade Design and Optimization

Abstract: This work aims at designing and optimizing the performance of a small Horizontal-Axis-Wind-Turbine to obtain a power coefficient (C_P) higher than 40% at a low wind speed of 5 m/s. Two symmetric in shape airfoils were used to get the final optimized airfoil. The main objective is to optimize the blade parameters that influence the design of the blade since the small turbines are prone to show low performance due to the low Reynolds number as a result of the small size of the rotor and the low wind speed. Therefore, the optimization process will select different airfoils and extract their performance at the design conditions to find the best sections which form the optimal design of the blade. The sections of the blade in the final version mainly consist of two different sections belong to S1210 and S1223 airfoils. The optimization process goes further by investigating the performance of the final design, and it employs the blade element momentum theory to enhance the design. Finally, the rotor-design was obtained, which consists of three blades with a diameter of 4 m, a hub of 20 cm radius, a tip-speed ratio of 6.5 and can obtain about 650 W with a Power coefficient of 0.445 at a wind-speed of 5.5 m/s, reaching a power of 1.18 kW and a power coefficient of 0.40 at a wind-speed of 7 m/s.

Turbine Design and Its Impact on Energy Harvesting From In pipe Hydro Systems

Abstract: This paper aims at investigating the impact of the utilized turbine design on the harvested energy from in-pipe systems. Four turbine designs are involved in this study which includes the spherical turbine and the Helical (Egg Beater) with three blades, four blades, and five blades. The proposed turbines are designed and they have been implemented in a prototype to determine the performance of each design. The study presents design procedures and the design requirements of each employed turbine before the implementation phase. The next step is to collect the produced torque, rotational speed, pressure drop, and output power for each turbine experimentally. The results have been analyzed and compared to show the design impact on these parameters. Finally, a case study is carried out on the major water distribution network in Amman the capital of Jordan to determine the possible locations, which are benefited from the implementation of the in-pipe system with the examined turbines.

Optimized Modeling of Ni-Mh Batteries Primarily Based on Taguchi Approach and Evaluation of Used Ni-Mh Batteries

Abstract:This paper aims to generate an optimized model of the Ni-MH battery based on the Taguchi method and it further aims to evaluate used Ni-MH batteries that served in hybrid electric vehicles and electric vehicles. The status of twelve used Ni-MH batteries is studied to determine their usefulness after their life cycle in automotive applications. The status of used batteries is evaluated by investigating their state of charge, remaining useful life, and degradation in performance. Accordingly, the tested

batteries are classified into four categories and they are proposed to serve in different applications. The novelty of the work lies in modeling used Ni-MH hybrid batteries by extracting a model that can define and calculate the battery voltage during the discharging phase, and it can study the influence of design parameters under certain conditions regardless of whether the battery is brand-new or used. Therefore, a second-order model is used to represent the used battery where an explicit mathematical formula expresses the discharge voltage of the new Ni-MH battery at different discharge pulse times, optimized later utilizing the Taguchi optimization method. Finally, the discharge voltage obtained using the developed model for different batteries is benchmarked against the actual measured discharge voltage by calculating the root mean square error.

Evaluating and Repurposing of Used Ni-Mh Hybrid Batteries
Oct. 2018

International Renewable and Sustainable Energy Conference (IRSEC). IEEE

Abstract: This paper aims at evaluating and repurposing of the used Ni-MH hybrid batteries after their life-cycle in the hybrid electric vehicles application. This process passes through two main steps, which starts by determining the state of these batteries and analyzing their behavior during the charging and discharging cycles. The work extends to show the maximum attainable power and determines the Remaining Useful Life of the used batteries by applying non-destructive tests. The next step is to maximize the obtained power and to investigate the durability of the batteries by analyzing the degradation of the used Ni-MH batteries. In addition, the applicability of the used batteries for different load scenarios will be presented.

Engineering-Based Economical Evaluation of The Retired Ni-Mh Batteries From Electric And Hybrid electric Vehicles In Jordan
Oct. 2017

Australian Journal of Basic and Applied Sciences

Abstract: Driven by energy-conscious consumption, Jordan is continuously migrating towards hybrid and electric-hybrid solutions in terms of transportation vehicles. This created an abundance of retired batteries which are either stacked in warehouses and/or about to be illegally disposed of. This require economically feasible post- automotive solutions to avoid this environmentally harmful disposal. This paper presents an engineering-based (experimentally verified) economical evaluation of retired NiMH batteries. This process passes through two main steps, which starts by determining the state of these batteries and analyzing their behavior during the charging and discharging cycles. The work extends to show the maximum attainable power and determines the Remaining Useful Life of the used batteries by applying non-destructive tests. The retired batteries were found to be diverse in their potential, where a non-negligible share (40%) of them can still be repurposed in secondary applications.

OTHER PUBLICATIONS

The Methodology of Insertion of Smart Grid and Grid Connected Systems in Education
Jul 2018

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Current Situation and Need for Smart Grid Education Program
Jun 2018

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Smart Grids Survey Report Target Group: Universities Teaching Staff in (Mena Region)
Jun 2018

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Smart Grids Survey Report Target Group: University Staff (European Region)
Jul 2018

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Smart Grids Survey Report Target Group: Stakeholders
Oct 2020

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Smart Grids Survey Report Target Group: Students
Sep 2018

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Report of Special Training Session of AT- SGIRES Project for the Syrian Partners Conducted by German Jordanian University and University of Newcastle
Mar 2020

Erasmus+ project No. 585648- EPP-1-2017-1-UKEPPKA2-CBHE-JP

Course Module: Technological Innovation on Smart Grids and Renewable Energy Sources
Jan 2019 - Jun 2020

REFERENCES ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

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German Jordanian University

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Technical University of Chemnitz
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