

Hammad Hasan

📍 United Arab Emirates | ✉ hammadkhasan@gmail.com | ☎ +971 56 432 3947 | in LinkedIn | 📁 Portfolio

Electrical Engineer | MATLAB/Simulink | PSCAD | PSS/E | UAE Golden Visa

Research experience in dynamic modelling, simulation, and validation of electrical systems. Skilled in MATLAB/Simulink, PSCAD, Python, and technical writing. Interested in power system studies, EMT simulations, and renewable grid integration.

Experience

Research Associate, Khalifa University Aug 2024 – Dec 2025

- Control of motor drives: both continuous and discrete-time control theory, flux estimation using observers, field-oriented control, direct torque control, and model predictive control.
- Control simulation and hardware validation via MATLAB/Simulink: including auto-generation of embedded C code and integration into the control board.
- Applied a stator rewinding approach to convert a conventional three-phase induction machine into a five-phase machine using star-of-slots theory.
- Designed PCBs for a SiC-based hybrid DC-DC converter, single-phase inverter and gate drivers modules.
- Application of neural networks and other machine learning techniques in the detection and localization of faults on multiphase induction machines.
- Assisted undergraduate students in the development and execution of their senior design projects.

Selected Projects

Transmission Operational Planning and Renewable Integration Study May 2026 – Present

- Built and validated an IEEE 39-bus model in PSS/E, including power-flow and N-1 contingency studies.
- Integrated a 250 MW renewable plant with steady-state and dynamic REGCA1/REECA1/REPCA1 models.
- Developed Python scripts using PSS/E APIs for model changes, contingency screening, P-Q analysis, and results extraction.
- Extending the study to N-2, N-1-1, extreme contingencies, load scenarios, and voltage/VAr support using capacitors, reactors, SVCs, and STATCOMs.

Dynamic Performance Assessment of Grid-Following and Grid-Forming Inverters April 2026 – May 2026

- Modelled and analyzed a droop-based grid-forming three-phase voltage-source inverter in PSCAD.
- Simulated and compared grid-following and grid-forming inverter control methods for weak-grid conditions.

Scalable Step-Up DC-DC Converter Based on Active Switched Inductors Nov 2025 – April 2026

- Designed a scalable series-parallel switched-inductor high-gain DC-DC step-up converter.
- Designed the PCB for a 1 kW prototype for 40 V–400 V DC conversion at switching frequencies of up to 50 kHz.
- Designed and implemented a closed-loop controller for DC output voltage regulation based on small-signal analysis.

Control of Multiphase Induction Machines for Electric Vehicles Jan 2025 – Dec 2025

- Simulation and hardware implementation of RFOC, DTC, MPC for five-phase induction machines.
- Development of an improved DTC technique for five-phase drives with reduced common-mode voltage.
- Proposed a novel direct model predictive flux control method for multiphase induction machines.

Fault Diagnosis of Multiphase Electrical Drives Using Machine Learning Aug 2024 – Dec 2024

- Developed and trained machine learning models to diagnose switch faults in five-phase induction machines.
- Data collected from MATLAB simulations and hardware prototype.
- Offline fine-tuning and testing of the machine learning models on experimental data.

Education

Khalifa University, Abu Dhabi, United Arab Emirates

Master of Science in Electrical and Computer Engineering

Aug 2022 – May 2024

Thesis: "Fault Diagnosis of Multiphase Electrical Drives Using Machine Learning"

- GPA: 3.88/4.00
- Numerical simulation of a rotor field-oriented controlled five-phase induction machine on MATLAB/Simulink.
- Developed an experimental prototype for a 1.4 kW five-phase induction drive system.
- Applied machine learning algorithms to detect and localize open-switch and open-phase faults.
- Teaching assistant for the "Introduction to Python" and "Data Structures and Algorithms" courses.
- **Coursework:** Power System Analysis, Distribution Systems Design and Utilization, Power Electronics

National University of Computer and Emerging Sciences, Islamabad, Pakistan

Bachelor of Science in Electrical Engineering

Aug 2017 – May 2021

- GPA: 3.57/4.00
- Ranked within the top 5% of 150 students in my batch.
- Hands-on experience with ATmega328P, 8051, and ESP32 microcontrollers.
- Proficiency in Object-Oriented Programming (C++) and Assembly Language.
- **Coursework:** Power System Operation & Control, Power Distribution & Utilization, Power Generation

Skills

Programming Languages: Python, MATLAB, C++ , LaTeX

Development Tools: MATLAB, Simulink, KiCad, Altium Designer, LTspice, PLECS

Power Systems Modelling: MATLAB, PSCAD, PSS/E, Python

Key Achievements

- Recipient of a 10-year UAE golden visa for outstanding academic performance in 2024
- Awarded Khalifa University’s Master Research Teaching Scholarship from 2022 to 2024
- Silver medalist for academic performance in 2017 and 2018

Certifications

EMT Training & Integrated Planning: Assuring Stability in Modern Systems

PSS/E Basic Modelling

Transmission Lines 101 & High-Speed Design Foundations

Energy Production, Distribution & Safety (Coursera)

Machine Learning (Coursera)

TOEFL iBT: 5.5/6; GRE: 316/340 (Q: 167, V: 149, AW: 4)

ESIG

Power Projects

EEcosystem

University at Buffalo

DeepLearning.AI and Stanford University

ETS

Publications

H. Hasan, O. A. Zaabi and A. R. Beig, "Sensorless Model Predictive Flux Control of a Five-Phase Induction Machine," *2026 International Power Electronics Conference (IPEC-Nagasaki 2026 - ECCE Asia), Nagasaki, Japan, 2026*, pp. 1-6, doi: 10.23919/IPEC-Nagasaki2026-EC64663.2026.11597441.

H. Hasan, O. A. Zaabi, K. A. Hosani, and M. E. Moursi, “Data-Driven Fault Diagnosis and Localization in Multiphase Induction Drives,” in *2024 6th International Conference on Smart Power & Internet Energy Systems*, Dec. 2024, pp. 118–123. doi:10.1109/SPIES63782.2024.10983462.