Curriculum Vitae

Personal information

First name(s) / Surname(s)	*Aboubakr Salem*
Affiliation	Assistant Professor with West Virginia University, Institute of Technology.
Address	507 S Kanawha St, Beckley, WV 25801, USA.
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Education

Doctorate	**Doctorate of Electromechanical Engineering /UGENT, Belgium. October 2015.**
Master Degree	**Master of Science in Electrical Engineering / Helwan University, Egypt. July 2009**
Degree / Affiliation	**Bachelor of Science in Electrical Engineering / Faculty of Engineering, Department of Electrical Power and Machine, Helwan University, Cairo, Egypt. 2004.**

Work Experience

Assistant Professor	Assistant Professor at WVU, Institute of Technology, Electrical and Computer Engineering Dept., Beckley, WV.
Occupation held	Aug. 12nd, 2022 till now

➢ Teaching courses and Labs (Microelectronics, Electrical machines, Microprocessor systems, Electrical Instromentation, Digital Logic, …etc.)
➢ Preparing research proposals for funded projects.
➢ Developing Courses and Laboratories.
➢ Advising students.
➢ Research work.
➢ Participating in search committees.
➢ Preparing Curriculum and joining in preparing ABET documentation.

Teching Assistant Professor	Teching Assistant Professor at Oregon Institute of Technology, Electrical Engineering Dept., Renewable Energy Engineering Program, Oregon Institute of Technology, Klamath Falls, Oregon
Occupation held	Sept. 15th, 2021 till July 31st 2022.

➢ Teaching courses and Labs (Power electronics, Electrical machines, and Electrical Drives Courses, Electrical Circuits, Capstone Projects, …etc.)
➢ Preparing research proposals for funded projects.
➢ Developing Courses and Laboratories.
➢ Advising students.
➢ Research work.
➢ Participating in search committees.
➢ Preparing Curriculum and joining in preparing ABET documentation.

Visiting Assistant Professor	Visiting Assistant Professor at Electrical Engineering Dept. Faculty of Engineering, King Fahd University of Petroleum and Minerals.
Occupation held	Jan. 6th, 2019 till Aug. 31st, 2021.
Duties	➢ Teaching courses and Labs (Power electronics, Electrical machines, and Electrical Drives Courses, Electrical Circuits, Capstone Projects, …etc.) ➢ Preparing research proposals for funded projects. ➢ Developing Courses and Laboratories. ➢ Advising students. ➢ Research work. ➢ Preparing Curriculum and joining in preparing ABET documentation.
Postdoctoral	Postdoctoral Fellow at Electrical Engineering Dept. Faculty of Engineering, King Fahd University of Petroleum and Minerals.
Occupation held	Feb. 5th, 2017 till Jan. 5th, 2019.
	➢ Research work related to power electronic converter, particularly multi-level advanced topologies. ➢ Teaching courses and Labs (Power electronics, Electrical machines, Electrical Drives Courses, Capstone Projects, …etc.) ➢ Preparing research proposals for funded projects.
Assistant Professor	
Occupation held	Oct. 2015 till Jan. 2017
	Assistant Professor at Dept. of Electrical Power and Machines, Faculty of Engineering, Helwan University, Cairo, Egypt.
Duties	➢ Teaching courses and Labs (Power electronics, Electrical machines, and Electrical Drives Courses, Electrical Circuits, Capstone Projects, …etc.) ➢ Preparing research proposals for funded projects. ➢ Developing Courses and Laboratories. ➢ Advising students. ➢ Research work. ➢ Preparing Curriculum and joining in preparing ABET documentation. ➢ Funds: o Euro-Sun-Med project: this project aims to implement a CSP solar power station, based on Heliostat technology, for academic research. My contribution is in the part of Heliostat control for solar tracking and online calibration. o STS-Med project: this project aims to implement a complete CSP thermal power station based on LFR technology. The project is a cooperation between HU, Academic of Scientific Research, and European partners from Spain and Italy. My contribution is in the part of LFR control for solar tracking.
Teaching Assistant	
Occupation held	2006 – Nov. 2012
Position	Teaching Assistant, Faculty of Engineering, Helwan University
Duties	Teaching the following exercise sessions and laboratories: 1- Power electronics, 2- Microprocessor, Microcontroller, and interface circuits. 3- Electrical Machines. 4- Programing languages as {C++, MATLAB….etc.}. 5- Electrical Circuits.

6- Electric drive systems.

7- Electromagnetic Fields.

Besides teaching, some experimental test setups have been implemented in Master thesis and senior projects as follows:

   a. Smart drive.
   b. Smart meters for smart grid.
   c. Shunt Active power filters and advanced static VAR compensator.
   d. Drive applications for electric vehicles.
   e. Wind renewable energy.
   f. Two-level inverter and control using all PWM types for:

• Speed control of IM using different inverter topologies (i.e. two-level and multilevel inverters).

• Fault diagnostics of the DC/AC converters.

• Connecting renewable energy sources to Grid.

• Dual two-level inverter operates open ends induction machines.

• Buck, boost, and buck-boost converters.

• Controlled rectifier (half and full wave- uncontrolled, half controlled, and full controlled – single and three phases).

Academic Developments:	
Development	**University**
• **Designing and Establishing a laboratory for Power Electronic courses.** • **Designing and Establishing a printed circuit board laboratory.** • **Developing the Power Electronics course.** • **Developing Electrical Machines Lab.** • **Participated in 2 Funded Projects as a Co-I**	**Helwan University, Cairo, Egypt.**
• **Establishing a complete research lab for electrical drives and renewable energy applications based on recent power electronic converters and semiconductor technologies.** • **Developing a complete laboratory for power electronic courses.** • **Writing a laboratory manual of 10 experiments for Power Electronic Laboratory.** • **Developing Electrical Machines course to include the most recent technologies in drive systems.** • **Developing a course for Photovoltaic systems for the Master's program.** • **Participated in 9 projects (PI and Co-I)**	**King Fahd University for Petroleum and Minerals, Dhahran, KSA**
• **Developing the electrical energy conversion course.** • **Establishing a laboratory for electrical machines (6 Experiments)** • **Developing a course for the advanced power electronics application for renewable energy (Course and Lab)**	**Oregon Institute of Technology, Klamath Falls, OR, USA.**

Industrial Experience:	
Consultant for DAR-ELMEMAR	Working (Part-time) with DAR-ELMEMAR (DMG) as a consultant Engineer in the period 2005-2012.

Scope of work	Power distribution and utilization.
	o The major work is designing and executing electrical works for buildings, villages, villas, hospitals, and hotels.
	o Electrical works include the design and execute the following:
	  ▪ Interior & exterior Lighting Systems and their Network.
	  ▪ Low voltage and Medium Voltage Distributers
	  ▪ Cable Feeders & Bus-Duct Feeders
	  ▪ Earthing Systems
	  ▪ Elevators and Escalators
	  ▪ Electrical Power of the Central Air-Conditioning System
	  ▪ Fire Alarm System & Public Address Sound System
	  ▪ Phone and Internet Network System
	  ▪ Monitoring and Control System
	  ▪ Security System

Some projects with DMC	o More than 20 different villas.
	o COOK-DOOR chain all over Egypt. (6 branches)
	o ELFAREDA Store Center at City-Stars shopping mole, Nasr City, Cairo, Egypt.
	o Other buildings:
	  ▪ B- TECH Olympic group, Red Mountain branch, Nasr City, Cairo, Egypt.
	  ▪ B- TECH Olympic group, ENBI branch, Nasr City, Cairo, Egypt.
	  ▪ Aman Medical Center in Helwan, Cairo, Egypt.
	  ▪ AGYAD mall at 6-October city.

Research Center for Technological Development.	Working in Research Center for Technological Development (RCTD) at Helwan University, in Cairo, Egypt, as a consultant, from the period 2006-to 2012 and from Fall 2015 to January 2017.
Scope of work	The scope of the work was power distribution and utilization in the new villages to improve the power capacity in some villages, and design a new network for these villages.
Some Projects	o Eastern company – Factory 6 o Reviewing and developing electrical networks for different **fifteen villages** o in **Behera city, Egypt**. o Development and renewing the electrical networks of the faculty of o engineering in Helwan University. o Development and renewing the electrical networks for air-condition o networks in twelve colleges at Helwan University. Developing the electrical power networks for RAMSES tourist village, North-Coast, Alexandria, Egypt.

Technical Skills

Power Electronic converters Design
- PCB design and prototyping
- Hardware prototyping
- Embedded system programming (MCS51" assembly", PIC, ARM cortex, AVR, …etc.)
- FPGA programing using Matlab\HDL coder, Vivado, ISE SysGen.
- HIL, dSPACE, Real-time simulator using Opal-RT.
- Programming Language and simulation Tools (MATLAB, C, C++).

Funds

- OIT summer grant Project # ORE060   (PI)
  The project aims to implement a test setup based on Multilevel Drive Systems with advanced Model Predictive Control Technique. The funs is USD 70 k.
- KFUPM funded project # GTEC1701 (CoI)
  This project aims to implement an advanced drive system for the Heliostat CSP plant. Fund (SAR 306 K)
- KFUPM funded project # SR 1811016 (PI)
  Design and Control of Advanced T-type Multilevel Converters Based on New Semiconductor Technologies for Smart Grid Applications. Fund (SAR 81.5 K)
- KFUPM funded project # DF191004 (CoI)
  Advanced Controller Design of Solar Energy Systems. Fund (SAR 300 K)
- ARAMCO funded Project # EE2500 (CoI)
  A Feasibility Study of using a Switched Reluctance Motor in Electric Submersible Pumps".
  Fund (SAR 240 K).
- KFUPM funded project # INRE2102 (PI)
  Grid-Forming Converters for Frequency Stabilization of Power Systems with High Penetration Level of Renewable Energy Sources. The fund is SAR 150 k.
- KFUPM funded project # DF201011 (CoI)
  Frequency Control and Inertia Support for Microgrids. The fund is SAR 208k.
- KFUPM funded project # INRE2106 (CoI)
  Development of robust integrated control for energy storage systems. The fund is SAR 140k.
- KFUPM funded project # INRE2103 (CoI)
  Advanced Wide Band Gap-based Drive System Considering Harsh weather conditions. Find is SAR 140k
- KFUPM funded project # DF201022 (CoI)
  Adaptive Virtual Inertia Control. The fund is SAR 283.9k.

- Euro-Sun-Med project: (CoI)
  The project aimed to implement an academic prototype solar power plant (solar power tower: Heliostat topology) for research work. The fund is € 2 million
- STS-Med project: (CoI)
  The project aimed to implement an academic prototype solar power plant (Linear Fresnel topology) for research work. The fund is € 20 million.

Publications

Patents

1. **A. Salem, M. Abido, and M. Mamdouh. "Common-mode voltage reduction of a sic based dual t-type drive system." U.S. Patent Application 17/200,194, filed March 17, 2022.**
2. Invention titled, "Fast Model Predictive Torque and Capacitor Balancing Control for a SiC-based Multilevel AC Drives", (**KFUPM Reference #:2019-118**. **Attorney Docket #527314US). Submitted.**

3. Invention titled, "Design, Implementation, and Control of a SiC-Based T5MLC Induction Drive System", **(KFUPM Reference #:2020-116)**. **Internally Submitted** in KFUPM in August 2020.

International Journal (ISI Web of Science)

1. W. Hamanah, **A. Salem**, et. al., (2022). Modeling, Implementing, and Evaluating of an Advanced Dual Axis Heliostat Drive System. *Journal of Solar Energy Engineering*, *144*(4), 041001. **(Q1- IF. 2.384).**

2. **A. Salem**, A., M. A. Abido, & F. Blaabjerg. (2021). Common-Mode Voltage Mitigation of Dual T-type Inverter Drives using Fast MPC Approach. *IEEE Transactions on Industrial Electronics*. **(Q1- IF. 8.236).**

3. W. Hamanah, **A. Salem**, M. Abido, A. Qwbaiban & T. Habetler. (2021). Solar Power Tower Drives: A Comprehensive Survey. *IEEE Access*. **(Q1- IF. 4.09).**

4. M. S. Alam, F. S. Al-Ismail, **A. Salem**, & M. A. Abido. "High-Level Penetration of Renewable Energy Sources into Grid Utility: Challenges and Solutions". *IEEE Access*, *8*, 190277-190299. Oct. 2020

5. **A. Salem** "Design, Implementation and Control of a SiC-Based T5MLC Induction Drive System", *IEEE Access*. Early access article, DOI: 10.1109/ACCESS.2020.2991691, June 2020– **(Q1- IF. 4.09).**

6. M. H. Arshad, M.A. Abido, **A. Salem**, & A. Elsayed. "Weighting Factors Optimization of Model Predictive Torque Control of Induction Motor Using NSGA-II with TOPSIS Decision Making". *IEEE Access*, *7*, 177595-177606, Sept. 2019– **(Q1- IF. 4.09).**

7. **A. Salem**, M. Mamdouh, and M. Abido. "Predictive Torque Control and Capacitor Balancing of a SiC-Based Dual T-type Drive System." *IEEE Transactions on Power Electronics*, March 2019 – **(Q1- IF. 7.224)**

8. **A. Salem**, M. Mamdouh & M. A. Abido. "Capacitor Balancing and Common-Mode Voltage Reduction of a SiC Based Dual T-Type Drive System Using Model Predictive Control". *IEEE Access*, 7, 41066-41077. (2019)– **(Q1- IF. 4.09)**

9. **A. Salem**, and M. A. Abido. "T-type multilevel converter topologies: A comprehensive review." Arabian Journal for Science and Engineering 44, no. 3 (2019), 1713-1735. **(Q3 – IF 1.518)**

10. T. Yousef, **A. Salem**, et al. "GPS Synchronization of Smart Distributed Converters for Microgrid Applications", Energies, 11(4), (2018), 695. **(Q3- IF. 2.707)**

11. T. Yousef, M. Elsied, **A. Salem** et al. "Carrier extraction based synchronization scheme for distributed DC–DC converters in DC-Microgrid." Electric Power Systems Research 161 (2018): 114-122. **(Q2-IF. 3.022)**

12. M. Harby, **A. Salem**, S. Elmasry, A. El Samahy & H. Elzoghby. (2018). Fault Ride-Through Study and Control of a Wind Turbine Driving Squirrel Cage or Doubly Fed Induction Generator: A Comparative Study. *Asian Journal of Engineering and Technology*, *6*(6).

13. **A. Salem**, A. Abdallh, P. Rasilo, et al. "The effect of common-mode voltage elimination on the iron loss in machine core laminations of multilevel drives". IEEE Transactions on Magnetics, 51(11), (2015), 1-4. **(Q3-IF 1.651)**

14. **A. Salem**, A. Abdallh, F. De Belie, L. Dupr, and J. Melkebeek. "A Comparative Study of the Effect of Different Converter Topologies on the Iron Loss of Nonoriented Electrical Steel." IEEE Transactions on Magnetics, 50, no. 11 (2014), 1-4. **(Q3-IF 1.651)**

15. P. Rasilo, **A. Salem**, et al."Effect of Multilevel Inverter Supply on Core Losses in Magnetic Materials and Electrical Machines." Energy Conversion IEEE Transactions on, PP, no. 99, (2014), 1-9. **(Q1 – IF 4.614)**

16. P. Rasilo, **A. Salem**, Ahmed Abdallh, F. De Belie, Luc Dupr, and Jan Melkebeek. "Closure to Discussion on "Effect of Multilevel Inverter Supply on Core Losses in Magnetic Materials and Electrical Mchines"." IEEE Transactions on Energy Conversion 30.4 (2015), 1605-1605. **(Q1 – IF 4.614)**

Papers in international Conferences

1. **A. Salem**, M. A. Abido, "Fast and Efficient MPC Approaches for Multilevel Drives Considering Cost Function Terms Dependency", *International Conference on Renewable Energies and Power Quality (ICREPQ '20)*, July, 2022

2. Hamanah, W. M., **A. Salem**, M. A. Abido, T. G. Habetler, and A. M. Qwbaiba. "Dual-Axis Tracking Electrical Drives for Solar Power Tower." In *19th International Conference on Renewable Energies and Power Quality, Almeria, Spain*. 2021.

3. Y., M., Abou Shehada, I., Alsulami, S., Abou Mahmoud, I., Muqaibel, A., Abido, M., & **A. Salem**, A. Design of a Wireless Heliostat System. In *2021 International Symposium on Networks, Computers and Communications (ISNCC)* (pp. 1-5). IEEE.

4. M. H. Arshad, A. Elsayed, M. Abido & **A. Salem**. (2020, November). Artificial Bee Colony Optimized Self-tuning PI Speed Controller for FCS-MPCC of Permanent Magnet Synchronous Machines. In *2020 First International Conference of Smart Systems and Emerging Technologies (SMARTTECH)* (pp. 220-226). IEEE.

5. W. Hamanah, **A. Salem**, and M. A. Abido "Heliostat Dual-Axis Sun Tracking System: A Case Study in KSA", *International Conference on Renewable Energies and Power Quality (ICREPQ '20)*, Sept. 2020.

6. **A. Salem**, M. Abido, "Fast and Efficient MPC Approaches for Multilevel Drives Considering Cost Function Terms", *EEEIC 2020, Madrid*. Accepted for Publication. June 2020.

7. **A Salem**, FD Belie, T Yousef, J Melkebeek, OA Mohamed, MA Abido, "Advanced multilevel converter applied to an open-ends induction machine: Analysis, implementation and loss evaluation", *Electric Machines and Drives Conference (IEMDC)*, 2017 IEEE International, 1-8.

8. M Mamdouh, **A Salem**, MA Abido, "An Improved Multi-objective Fuzzy Decision Based Predictive Torque Control of Induction Motor Drive", *Industrial Electronics Society, IECON 2017 - 43rd Annual Conference of the IEEE*, 8675 – 8680, 2017

9. M. Taleb, **A. Salem**, A. Ayman, M. Azma, M. A. Abido, "Advanced Technique for Optimal Allocation of Static Var Compensators in Large-Scale Interconnected Networks", *Industrial Electronics Society, IECON 2017 - 43rd Annual Conference of the IEEE*, pp. 73 – 78, 2017.

10. **A Salem**, F De Belie, T Youssef, J Melkebeek, O Mohammed, M Abido, "DC link capacitor voltage balancing of a dual three-level T-Type AC drive using switching state redundancy", *Electric Machines and Drives Conference (IEMDC), 2017 IEEE International*, 1-8.

11. M Taleb, **A Salem**, A Ayman, MA Azma, "Optimal allocation of TCSC using adaptive cuckoo search algorithm", *Power Systems Conference (MEPCON), 2016 Eighteenth International Middle East*, 2017 IEEE International, 2016.

12. **A. Salem**, F. De Belie, and J. Melkebeek. "A novel space-vector PWM computation for a dual three-level T-type converter applied to an open end-winding induction machine." *Power Systems Conference (MEPCON), 2016 Eighteenth International Middle East*. IEEE, 2016.

13. M. Elsied, **A. Salem**, A. Oukaour, H. Gualous, H. Chaoui, F. T. Youssef, F. De Belie, J. Melkebeek, O. Mohammed " Efficient Power-Electronic Converters for Electric Vehicle Applications." *In 2015 IEEE Vehicle Power and Propulsion Conference (VPPC),* Canada 2015.

14. **A. Salem**, F. De Belie, P. Sergeant, A. Abdallh, J. Melkebeek. "Loss Evaluation of Interior Permanent-Magnet Synchronous Machine Drives Using T-Type Multilevel Converters", *In International Conference on Environment and Electrical Engineering, EEEIC 2015-15th Annual Conference of the IEEE*, Rome, 2015.

15. **A. Salem**, A. Abdallh, F. De Belie, L. Dupr, and J. Melkebeek. "The Effect of Common-Mode Voltage Elimination on the Iron Loss in Machine Core Laminations of Multilevel Drives", *IEEE International Magnetics Conference*, INTERMAG Europe 2015, Beijing, China; 05/2015.

16. **A. Salem**, A. Abdallh, F. De Belie, L. Dupr, and J. Melkebeek. "A comparative analysis of the effect of different converter topologies on the iron loss of non-oriented electrical steel", *IEEE International Magnetics Conference, INTERMAG Europe 2014*, Dresden, Germany; 05/2014.

17. **A. Salem**, M. Elsied, F. De Belie, H. Gualous, and J.Melkebeek. "An Advanced Multilevel Converter Topology with Reduced Switching Elements." *In Industrial Electronics Society, IECON 2014-40th Annual Conference of the IEEE*, pp. 1201-1207. IEEE, 2014.

18. **A. Salem,** F. De Belie, A. Darba, M. Eissa, S. Wasfy, and J. Melkebeek. "Evaluation of a dual-T-type converter supplying an open-end winding induction machine." *In Industrial Electronics Society, IE-CON 2013-39th Annual Conference of the IEEE*, pp. 749-754. IEEE, 2013.

19. A Darba, F De Belie, **A Salem**, J Melkebeek , "FPGA-based implementation of the back-emf symmetric-threshold-tracking sensorless commutation method for brushless dc-machines", *Sensorless Control for Electrical Drives and Predictive Control of Electrical Drives and Power Electronics (SLED/PRE-CEDE)*, 2013 IEEE International Symposium.

20. SMW Ahmed, GMA Sowilam, **A. Salem**, "Practical implementation of a dual inverter operates open ends induction motor" *Design and Test Workshop (IDT), 2009 4th International conference*, KSA, 2009.

21. SMW Ahmed, GMA Sowilam, **A. Salem**, "Open ends induction motor operation based on a dual inverter " *Design and Test Workshop (IDT), 2009 4th International Conference*, KSA, 2009.

22. S. Ahmed, M. M. Eisa, G. Sowilam, **A. Salem**, "Open ends induction motor operation based on a dual inverter " *19th International Conference on Computer Theory and Applications ICCTA'2009*, Alexandria, October 2009

Postgraduate Supervision:	
Master students at HU.	Two master thesis have been supervised as follows: 1- Grid Connected Wind Turbine Based On Advanced Control Technique. 2- Advanced Technique for Optimal Allocation of Static-VAR Compensators in Large-Scale Interconnected Networks.
MS and PhD students at KFUPM.	Defended/in progress MS and Ph.D.: 1- Intelligent Model Predictive Control of Induction Motor. (MS-Defended) 2- Computer Vision Base Energy Saving for Residential and Commercial Buildings. (MS-IP) 3- Switched Reluctance Motor Performance Investigations for Submersible Plumbs. (MS-IP) 4- A New Breaker-less protection strategy for Intelligent Dual-Active-Bridge Converter Based DC Microgrids. (MS-IP) 5- Solid-State Transformer Design and Implementation for Microgrid Applications 6- Design of an Autonomous Robust On-board Electric Vehicle Battery Charger for Energy Management in a Low Voltage Distribution System (PhD- IP)