Alireza Fatemi

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KEY SKILLS AND CORE COMPETENCIES

- Expertise in application-based design optimization of electric machines (PMSM, SynRM, IM)
- Expertise in multi-domain analysis of motor-drive systems
- Proficient in design and analysis of power electronic devices at the component and system levels
- Proficient in finite element analysis of electric machines (Electromagnetic/Mechanical/Thermal)
- Experience in popular motor control schemes (V/Hz, DTC, FOC, Sensorless, etc)
- Experience in power converter topologies and PWM techniques (DPWM, SVPWM, SHEPWM, etc)
- Applied knowledge of hardware-in-loop tools (Typhoon HIL 400) for power electronic systems
- Applied knowledge of heuristic and evolutionary algorithms for large-scale optimization problems
- Strong background in Design of Experiments (DOE), sensitivity analysis, and Design for Six Sigma (DFSS)
- Familiar with Electromagnetic Compatibility (EMC) issues and common EMI filters
- Excellent organizational, communication, and team building skills
- Excellent research and problem solving skills

PROFESSIONAL EXPERIENCE

General Motors Global Research & Development, GM Technical Center, Warren, MI.

- Research and Development Intern at Propulsion Systems Research Lab, Jun., 2015 – Aug., 2015
Duties: Design optimization of an IPM motor for a BAS hybrid power system

Marquette University, Milwaukee, WI.

- Research Assistant at Electric Machines and Drives Lab, Jan., 2014 – present
Duties: Research on various topics concerning design of high performance PM machines, funded by General Motors Corp. and Midwest Energy Research Consortium

- Teaching Assistant at Department of Electrical Engineering and Comp. Eng.*,* Aug. 2012 – Dec. 2013
Duties: Teaching assistant for several courses including Advanced Electric Motor-Drive Systems, Electric Circuits and Laboratory 1 & 2, Linear Systems Analysis, and Engineering Discovery

Power Supply Production Company, Tehran, Iran

- Research and Development Contractor, Mar. 2011 – Aug. 2011
Duties: Design and prototyping of a low-cost ac/ac converter for electronic power conditioners

Tarbiat Modares University, Tehran, Iran

- Research Assistant at Power Electronics and Protection Lab, Aug., 2008 – Mar. 2011
Duties: Research on a novel reduced-switch count power electronics converter and its residential applications

EDUCATION

Ph.D. Candidate: Electric Power and Energy Engineering, 2012 – July 2016 (expected)
Marquette University, Milwaukee, WI, USA, 4.0 GPA for 39 credits.
Dissertation Title: "Design Optimization of Permanent Magnet Machines Over a Target Operating Cycle Using Computationally Efficient Techniques."

Master of Science: Electric Power and Energy Engineering, 2008 – 2011
Tarbiat Modares University, Tehran, Iran, *Graduated Summa Cum Laude*, 3.64 Cumulative GPA.
Thesis title: "Design and Implementation of a Component Minimized Single-Phase Converter."

Bachelor of Science: Applied Electrical Engineering, Electronics Emphasis, 2006 – 2008
Shiraz University of Technology, Shiraz, Iran, *Graduated Summa Cum Laude*, 3.61 Cumulative GPA.
Senior design project: "Implementation of PC infrared remote control (PC IR Control) using RS232 Port."

Associate of Applied Science: Industrial Electronics, 2004 – 2006
Birjand University, Birjand, Iran, *Graduated Summa Cum Laude*, 3.67 Cumulative GPA.
Final program project: "Design and Implementation of a Temperature Control System Using AVRs."

AFFILIATIONS

- Student member of IEEE, and affiliated societies (IES, IAS, PES, PELS)
- Member of Society of Automotive Engineers (SAE) International
- Member of Sigma Xi (The Scientific Research Society), Marquette University Chapter

COMPUTER SKILLS
- Practical experience in finite element software packages including ANSYS Maxwell, ANSYS Workbench
- Practical experience in programing digital signal controllers including TI-TMS320F2812 and TI-TMS320F28335 DSPs, and Atmel AVRs
- Practical experience with system modeling software packages such as MATLAB, Motor-CAD, Plecs, Labview, Multisim, ANSYS Simplorer, ORCAD, PROTEL, PSCAD
- Programming skills in Visual C++, Visual Basic, and Assembly languages
- Experience with DAQ systems and professional measurement instruments

PROFESSIONAL CERTIFICATES
- Professional Modeling and Simulation of Power Electronics Systems, Aug. 27, 2014
- Electromagnetic and Thermal Design of Brushless PM Machines, May 15, 2014
- Fundamentals in Electromagnetic Compatibility, Mar. 25, 2014
- Synchronous Machines and Power Electronic Drives: Recent Progress in Design and Control, Sept. 13, 2013

INVENTION DISCLOSURE
'Optimum scaling of design parameters for efficient and low cost … IPM motor/generator with …" (In progress, file No. P034495), 2015.

SELECTED PUBLICATIONS
Journal Papers
1. A. Fatemi; N. A. O. Demerdash; T. W. Nehl; D. M. Ionel, "Large-scale Design Optimization of PM Machines Over a Target Operating Cycle," Accepted for publication in IEEE Transactions on Industry Applications , vol.PP, no.99, pp.1-1.
2. A. Fatemi; D. M. Ionel; N. A. O. Demerdash; T. W. Nehl, "Optimal Design of IPM Motors with Different Cooling Systems and Winding Configurations," Accepted for Publication in IEEE Transactions on Industry Applications , vol.PP, no.99, pp.1-1.
3. A. Fatemi; D. M. Ionel; N. A. O. Demerdash; T. W. Nehl, "Fast Multi-Objective CMODE-Type Optimization of PM Machines Using Multicore Desktop Computers," Early access in IEEE Transactions on Industry Applications , vol.PP, no.99, pp.1-1.
4. A. Fatemi, M. Azizi, M. Mohamadian, A. Yazdian Varjani and M. Shahparasti, "Single-Phase Dual-Output Inverters With Three-Switch Legs," in IEEE Transactions on Industrial Electronics, vol. 60, no. 5, pp. 1769-1779, May 2013.
5. M. Azizi, A. Fatemi, M. Mohamadian and A. Y. Varjani, "Integrated Solution for Microgrid Power Quality Assurance," in IEEE Transactions on Energy Conversion, vol. 27, no. 4, pp. 992-1001, Dec. 2012.
6. M. Shahparasti, A. Yazdian, M. Mohamadian, A. S. Larijani and A. Fatemi, "Parallel uninterruptible power supplies based on Z-source inverters," in IET Power Electronics, vol. 5, no. 8, pp. 1359-1366, September 2012.
7. M. Heydari, A. Y. Varjani, M. Mohamadian and A. Fatemi, "Three-phase dual-output six-switch inverter," in IET Power Electronics, vol. 5, no. 9, pp. 1634-1650, November 2012.

Conference Proceedings
1. A. Fatemi, D. M. Ionel, N. A. O. Demerdash and T. W. Nehl, "Fast multi-objective CMODE-type optimization of electric machines for multicore desktop computers," 2015 IEEE Energy Conversion Congress and Exposition (ECCE), Montreal, QC, 2015, pp. 5593-5600.
2. A. Fatemi, N. A. O. Demerdash and D. M. Ionel, "Design optimization of IPM machines for efficient operation in extended speed range," Transportation Electrification Conference and Expo (ITEC), 2015 IEEE, Dearborn, MI, 2015, pp. 1-8.
3. J. He, A. Fatemi, N. A. O. Demerdash and D. M. Ionel, "Diagnosis of stator short-circuit faults in series and parallel winding connections of closed-loop controlled PMSMs," 2015 IEEE International Electric Machines & Drives Conference (IEMDC), Coeur d'Alene, ID, 2015, pp. 1387-1393.
4. A. Fatemi, N. A. O. Demerdash, D. M. Ionel and T. W. Nehl, "Large-scale electromagnetic design optimization of PM machines over a target operating cycle," 2015 IEEE Energy Conversion Congress and Exposition (ECCE), Montreal, QC, 2015, pp. 4383-4390.
5. A. Fatemi, D. M. Ionel and N. A. O. Demerdash, "Identification of design rules for interior PM motors with different cooling systems," 2015 IEEE International Electric Machines & Drives Conference (IEMDC), Coeur d'Alene, ID, 2015, pp. 1228-1234.
6. A. Sadeghi, M. Mohamadian, M. Shahparasti and A. Fatemi, "A new switching algorithm for voltage balancing of a three-level NPC in DTC drive of a three-phase IM," Applied Power Electronics Conference and Exposition (APEC), 2013 Twenty-Eighth Annual IEEE, Long Beach, CA, USA, 2013, pp. 489-495.
7. M. Azizi, A. Fatemi , M. Mohamadian and A. Yazdian, "Dual-output four-leg inverter," Applied Power Electronics Conference and Exposition (APEC), 2013 Twenty-Eighth Annual IEEE, Long Beach, CA, USA, 2013, pp. 144-149.

8. <u>A. Fatemi</u>, M. Azizi, M. Mohamadian and A. Yazdian, "Single-phase Delta-conversion UPS," Power Electronics and Drive Systems Technology (PEDSTC), 2012 3rd, Tehran, 2012, pp. 448-453.

9. <u>A. Fatemi</u>, M. Azizi, M. Mohamadian and F. Ashrafzadeh, "A minimized switch count single-phase AC/AC converter with active front end," 2012 Twenty-Seventh Annual IEEE Applied Power Electronics Conference and Exposition (APEC), Orlando, FL, 2012, pp. 1502-1507.

10. M. Azizi, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "Cost-effective solution for microgrid power quality assurance," Power Electronics and Drive Systems Technology (PEDSTC), 2012 3rd, Tehran, 2012, pp. 150-155.

11. <u>A. Fatemi</u>, M. Azizi, M. Shahparasti, M. Mohamadian and A. Yazdian, "A novel single-phase six-switch AC/AC converter for UPS applications," Power Electronics, Drive Systems and Technologies Conference (PEDSTC), 2011 2nd, Tehran, 2011, pp. 408-414.

12. M. Heydari, <u>A. Fatemi</u>, A. Yazdian Varjani and M. Mohamadian, "A novel reduced switch count single-phase to three-phase AC/AC converter," IECON 2011 - 37th Annual Conference on IEEE Industrial Electronics Society, Melbourne, VIC, 2011, pp. 1120-1125.

13. M. Shahparasti, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "A novel single-stage power conversion system based on T-inverter for photovoltaic system connected to single phase AC grid," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-1.

14. M. Heydari, A. Yazdian Varjani, M. Mohamadian and <u>A. Fatemi</u>, "A novel dual-output six-switch three-phase inverter," IECON 2011 - 37th Annual Conference on IEEE Industrial Electronics Society, Melbourne, VIC, 2011, pp. 1109-1114.

15. <u>A. Fatemi</u>, M. Azizi, K. Rahmani, M. Mohamadian and A. Yazdian, "A novel reduced switch count multilevel AC/AC converter," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-1.

16. M. Azizi, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "A novel fault-tolerant four-leg AC/AC converter capable of compensating unbalanced source/load," Power Electronics, Drive Systems and Technologies Conference (PEDSTC), 2011 2nd, Tehran, 2011, pp. 540-545.

17. <u>A. Fatemi</u>, M. Azizi, K. Rahmani, M. Mohamadian and A. Yazdian, "A novel reduced switch count multilevel AC/AC converter," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-5.

18. M. Shahparasti, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "A novel single-stage power conversion system based on T-inverter for photovoltaic system connected to single phase AC grid," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-4.

19. <u>A. Fatemi</u>, M. Azizi, M. Shahparasti, M. Mohamadian and A. Yazdian, "A generalized algorithm for switch reduction in multioutput single-phase inverters: With/without Z-source impedance network," Power Electronics, Drive Systems and Technologies Conference (PEDSTC), 2011 2nd, Tehran, 2011, pp. 292-298.

20. M. Azizi, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "Novel application of dual-output four-leg converter for unified power quality conditioner," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-1.

21. M. Azizi, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "Novel application of dual-output four-leg converter for unified power quality conditioner," 2011 19th Iranian Conference on Electrical Engineering, Tehran, 2011, pp. 1-4.

22. M. Azizi, <u>A. Fatemi</u>, M. Mohamadian and A. Yazdian, "A novel Z-source four-leg inverter with two independent four-wire outputs," Power Electronic & Drive Systems & Technologies Conference (PEDSTC), 2010 1st, Tehran, Iran, 2010, pp. 163-168.

23. M. Shahparasti, A. Sadeghi Larijani, <u>A. Fatemi</u>, A. Yazdian Varjani and M. Mohammadian, "Quasi Z-source inverter for photovoltaic system connected to single phase AC grid," Power Electronic & Drive Systems & Technologies Conference (PEDSTC), 2010 1st, Tehran, Iran, 2010, pp. 456-460.

24. A. Sadeghi Larijani, M. Shahparasti, <u>A. Fatemi</u>, A. Amiri and M. Mohammadian, "DTC drive of induction motor using three-Level inverter with optimized switching table and minimizing the deviation of neutral point voltage," Power Electronic & Drive Systems & Technologies Conference (PEDSTC), 2010 1st, Tehran, Iran, 2010, pp. 255-260.

25. M. Azizi, <u>A. Fatemi</u> and M. Mohamadian, "Carrier based modulation scheme for z-source nine-switch inverter," 2010 18th Iranian Conference on Electrical Engineering, Tehran, 2010, pp. 1-1.