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Professor

Research Fields :

Design and shape optimization of electrical machines

Modeling, analysis, and control of electrical machines and drives

Finite element analysis in electromagnetic field

Biography

Mehdi Moallem (SM'90) received the Ph.D. degree in electrical engineering from Purdue University, West Lafayette, IN, in 1989. He is currently with the Department of Electrical and Computer Engineering, Isfahan University of Technology, Isfahan, Iran, where he is a Full Professor. He has authored more than 150 journal and conference papers. His research interests include design and optimization of electromagnetic devices, application of advance numerical techniques and expert systems to analysis and design of electrical machines, and power quality. Prof. Moallem is a recipient of many international and national awards.

Publications

Thesis and reports:

- M. Moallem, *Performance Characteristics of a Switched Reluctance Motor Drive*, Ph.D Thesis, 1989
- M. Moallem and C.M. Ong, *Finite Element Design of a 60KW, 6000 rpm Switched Reluctance Motor*, Post Doctoral Research Report submitted to Purdue University (for Sulair company), 1990
- M. Moallem, *PMDC Motor Performance Variation due to Magnetic Circuit Variations*, Report? submitted to Delco Product of GM Corp., 1990
- ?M. Moallem,? *Predicting Dynamic Performance of a Switched Reluctance Motor Drive using an Improved Magnetic Equivalent Circuit Method*, Report Submitted to Isfahan University of Technology, 1995
- M. Moallem, *Fault Analysis of High Power, Arc Furnace Transformers Using Signal Processing Techniques*, Report Submitted to Iran Steel Industry, 1996
- M. Moallem, *Intelligent Automatic Optimal Design of Electrical Machines* Research Report, Isfahan University of Technology, 2000
- M. Moallem *Intelligent? Fault detection of Induction Motors Using Stator Current? Wavelet Signal Analysis* Research report, National Steel Industry, 2001
- M. Moallem, *Intelligent Power Quality Analysis Using Wavelet Transform and Neuro-Fuzzy Systems* Research Report, Tehran Electric Company, 2002
- M. Moallem, *Design and development of an advanced power quality analyser*, Report submitted Tehran electric company, 2004
- M. Moallem and A. Kiyoumars, *Shape optimization of an internal permanent magnet synchronous machine to increase average torque and reduce torque ripple*, Research report, Isfahan University of Technology, 2005

? Journal Papers Published:

1. A. Sadoughi, M.Ebrahimi, M.Moallem; "Intelligent Diagnosis of broken bars in Induction Motors based on new features in vibration spectrum" Accepted for publication in Korean Journal of power Electronics, 2008
2. A. Kiyomarsi, M. Moallem, and B. Fahimi, *Mitigation of Torque Ripple in Interior Permanent Magnet Motors via Optimal Shape Design*, IEEE Trans. on Magnetics, Vol.42, No.11, Nov.2006

3. M. Moallem, A. Mirzaei, and B. Mirzaeian, *Design of an optimal Fuzzy controller for Anti-lock braking System*, IEEE Transaction on Vehicular Technology, Vol.55, No.5, Sep.2006
4. M. Moallem, A. Kiyomarsi, and M.R. Hassanzadeh *An accurate method for calculation of magnetizing inductances in interior permanent-magnet synchronous motors*, Electromotion Journal(Europe), Vol.12, No.1, 2005
5. A Kiomarsi and M. Moallem, *New Techniques on Power Calculation in in Non-sinusoidal, Unbalanced systems and its application to Arc Furnace power calculation*, Esteghlal Journal of Engineering, Isfahan University of Technology, 2005
6. M. Moallem, B. Mirzaeian and A. Mirzaei *Designing a Genetic- Fuzzy Anti-lock Brake System Controller*,? Intl. Journal of Engineering,vol. 18, 2005
7. M. Moallem, A. Kiyomarsi *A Novel Technique on Analytical Calculation of Flux Density Distribution in Brushless PM Motors*International Journal of Engineering, Vol.17, Number1, April 2004.
8. M. Moallem, B. Mirzaeian *Intelligent Automatic Design of Switched Reluctance Motor Using Genetic-Fuzzy Algorithms*IEEE Trans.on Magnetics, Vol.37, No.2, 2002.
9. B.Mirzaeian , M.Moallem, V. Tahani , and C.Lucas " *A New Multi- Objective Optimization Method Based on Genetic Algorithm and its application for Optimal Design of Switched Reluctance Motor* " ? IEEE Trans on Magnetics, Vol.38, No.3, May 2002.
10. S.Mirzaei, M.Saghaeian, and M. Moallem " *Electromagnetic Shook Absorber* " International Joarnal of science and Technology, Dec.2001
11. M. Moallem, ?B. Mirzaeian *A Fuzzy Expert System for Predicting the performance of a Switched Reluctance Motor*,International Journal of Engineering, Aug.2001
12. M.Moallem, B. Mirzaeian, O. A. Mohammd, and C.lucas " *Multi- Objective Genetic Fuzzy Optimal dosign of PI Controller in the Indirect Field oriented control of an Induction Motor* ", IEEE Trans. on Magnetics, Vol. 37 , No.5 Sep.? 2001
13. M.Moallem and G.E.Dawson, " *An Improved Magnetic Equivalent Circuit Method for Predicting the Characteristics of Highly Saturated Electromagnetic Devices*,? IEEE Trans. On Magnetics , Vol.34, No.3 ,Sep. 1998
14. M.Moallem and R.Jafari, " *Transformtion Method in the Coupled FE Magneto- Thermal Field Analysis* "IEEE Trans. On Magnitcs, Vol. 34, No. 3, Sep.? 1998
15. M. Moallem, C.M. Ong, and L.E. Unnewehr, *The Effect of Rotor Profile on the Torque of Switched Reluctance Motor*, IEEE Trans. On Industry Application, IAS-28,No.2, March 1992
16. M. Moallem and C.M. Ong, *Predicting the Steady-State Performance of a Switched Reluctance Motor Drive*,IEEE Trans. On Industry Application , IAS-27, No.6 , Dec.1991
17. M. Moallem and C.M. Ong, *Predicting the Torque of a Switched Reluctance Motor Using Its Finite Element Field Solution*, IEEE Trans. on Energy Conversion,EC-5, No.4 , Dec. 1990

Recent Refreed Conference Papers:

1. A. Sadoughi, M. Ebrahimi, M. Moallem, " Intelligent Diagnosis of broken bars in Induction Motors based on new features in vibration spectrum", 6th IEEE International Symposium on Diagnostics of electrical machines, power electronics, and drives, Cracow, Poland, Sep 2007
2. B. Fahimi, M. Moallem, S. Pekarek, " Qualitative investigation of force density components in electromechanical energy conversion process" IEEE_ IECON Conference, Paris, France, Nov. 2006
3. A. Kiyomarsi, M. Moallem, B. Fahimi, "A Novel transformation technique in analytical field solution of interior permanent magnet motor including magnet shape", IEEE-CEFC Conference, Miami, Florida, 2006
4. B. Fahimi, M. Moallem, " Field oriented linear induction motor drives: an electromagnetic perspective" IEEE-CEFC Conference, Miami, Florida, 2006
5. A. Mirzaei, M. Moallem, B. Mirzaeian, and B. Fahimi, Design of an optimal Fuzzy controller for antilock braking systems, Vehicular Power and Propulsion Conference (VPPC05), Chicago, Illinois, Sep. 2005
6. A. Kiyomarsi and M. Moallem, Optimal shape design of interior permanent magnet synchronous motor, International Electrical Machine and Drive Conference (IEMDC05), San Antonio, Texas, May 2005
7. A. Mirzaei and M. Moallem, Designing of Genetic-Fuzzy for antilock braking System? controller, IEEE International Symposium on Intelligent Control, Limassol, Cyprus, June 2005
8. A. Mirzaei, M. Moallem, and B. Mirzaeian, Optimal Design of a Hybrid Controller for Antilock Braking Systems, Advanced Intelligent Mechatronics Conference (AIM05), Monterey, California, July 2005
9. M. Moallem, A. Kiyomarsi, and B. Mirzaeian, Comparison of output characteristics of a Permanent-magnet and a Field winding DC starter motor, Sixth Symposium on Advanced Electromechanical Motion Systems, Electromotion 2005, Sep. 2005, Lausanne, Switzerland
10. M. Moallem, A. Kiyomarsi, and B. Mirzaeian, Rotor Eccentricity of Third Kind in a Rotating Electric Machine, Sixth Symposium on Advanced Electromechanical Motion Systems, Electromotion 2005, Sep. 2005, Lausanne, Switzerland

11. A. Kiyomarsi and M. Moallem, A new Analytical Method on the Field Calculation of Interior permanent magnet Synchronous motor, 16th International Conference on Electrical Machines (ICEM04), Cracow, Poland, Sep. 2004
12. M. Moallem, A. Kiyomarsi, and M.R. Hassanzadeh, Analytical calculation of Magnetizing Inductances of Interior Permanent-magnet Synchronous Machine 16th International Conference on Electrical Machines (ICEM04), Cracow, Poland, Sep. 2004
13. B. Mirzaeian, M. Moallem, and B. Enayati, Parameter Estimation of Induction Machine Using Hybrid Methods and Effects of Aging on Motor Parameters, EPE-2004, Latvia, Sep. 2004
14. A. Shafei, M. Moallem, and H. Bayervand, Error Estimation in Capacitor Voltage Transformer (CVT) Response in Non-sinusoidal Environment Using parameter sensitivity Analysis, 13th Conference on Electrical Engineering (ICEE), Mashhad, Iran, May 2004
15. M. Moallem and A. Kiyomarsi, A new analytical technique for Analysis of Rotor Eccentricity in Electrical Machines, International Aegean Conference on Electrical Machines and Power Electronics ACEMP2004, Istanbul, Turkey, May 2004
16. A. Kiyomarsi and M. Moallem, Analytical Calculation of Magnetizing Inductances of Permanent Magnet Synchronous Motor, Optim 2004, Brasov, Romania, May 2004
17. M. Moallem, A. Bakhshai and D. Yazdani *A Novel and Efficient Control Strategy for Three-Phase Boost Rectifiers* 11th ICEE, May 2003, Vol. 4
18. M. Moallem, F. Farid *Variable Structure Control (VSC) of Static VAR Compensator (SVC) to Improve Power-System Dynamic Stability* Electric Power and Electrical Machines (EPEMC) Conference, Shenghy, China, 2003.
19. M. Moallem, A. Kiyomarsi and M. R. Hassanzadeh *The Torque Ripples of Brushless Permanent-Magnet Motors* International Symposium on Power Electronics-Ee 2003, NOVI SAD, SERBIA & MONTENEGRO, November 2003.
20. M. Moallem, A. Kiyomarsi and M. R. Hassanzadeh *New Methods on Field Calculation of Brushless PM Motors* International Symposium on Power Electronics-Ee 2003, NOVI SAD, SERBIA & MONTENEGRO, November 2003.
21. M. Moallem, M. Saghaiannejad and S. Mirzaei *Electromagnetic Suspension System* 10th ICEE, May 2002, Vol. 4
22. M. Moallem and B. Mirzaeian, *A Fuzzy Expert System for Detection of Broken Bars on the Rotor of Induction Motors*, ICEM2002, Brugge, Belgium, Aug. 2002
23. M. Moallem, B. Mirzaeian *Intelligent Automated Optimal Design of Switched Reluctance Motor Using Genetic-Fuzzy Algorithms* Compumag Evian, France, July 2-5, 2001.

24. M. Moallem, G. Hannebrger, S. Farhangi and A. Deihimi, *Optimal Efficiency Design of Switched Reluctance Motor-Drive* Electromotion 2001, Bolona, Italy, June 2001.
25. M. Moallem and M.R. Hassanzadeh, *Switched Reluctance Motor Behaviour Under Static and Dynamic Eccentricity*, Compomag2001, Evian, France, Aug. 2001
26. M. Moallem, B. Mirzaeian and C. Lucas, *Multi-Objective Genetic Fuzzy Optimal Design of PI controller in the Indirect Field Oriented Control of an Induction Motor*, IEEE-CEFC2000, Milwaukee, Wisconsin, June 2000
27. M. Moallem and M. Zangiabadi, *Accurate prediction of Switched Reluctance Motor losses*, ICEM2000, Espoo, Finland, Aug. 2000
28. M. Moallem, *A New Multi-Objective Optimization Method Based on Genetic Algorithm and Its Application for Optimal Design of a Switched Reluctance Motor*, ICEM2000, Espoo, Finland, Aug. 2000
29. M. Moallem and G.E. Dawson, *An Improved Magnetic Equivalent Circuit Method for Predicting the Characteristics of Highly Saturated Electromagnetic Devices*, COMPUMAG97, Rio de Janeiro, Brazil, November 1997, Also Published in Trans. On Magnetics, Sep. 1998
30. M. Moallem and R. Jafari, *Transformation Method in the Coupled FE Magneto-Thermal Field Analysis*, COMPUMAG97, Rio de Janeiro, Brazil, November 1997, Also published in Trans. On Magnetics, Sep. 1998
31. M. Moallem and H. Nikkhajoei, *Predicting the Performance of a SRM Drive Using Improved Magnetic Equivalent Circuit Method*, Power Electronic and Drives Conference, PEDS95, Singapore, March 1995
32. M. Moallem and M. Madhkhan, *Sensitivity of Brushless DC Motor Performance Due to Magnetic Circuit Parameter Variations*, Power Electronic and Drives Conference, PEDS95, Singapore, March 1995
33. M. Moallem, *Suboptimal Control of Power System Dynamics Using a gradient Method*, Power System Conference, PSC94, St. Petersburg, Russia, 1994
34. M. Moallem, *Finite Element Solution of Highly Saturated Electromagnetic Field in Electrical Machines*, International Congress on Computer Application in Engineering, Shiraz-Iran, May 1993
35. H. Moghbeli, C.M. Ong, and M. Moallem, *Operational Characteristics of a SRM Drive*, International Conference on Electrical Machines and Drives, China, 1992

Area of Research

Design and shape optimization of electrical machines

Modeling, analysis, and control of electrical machines and drives

Application of evolutionary and advanced numerical techniques in analysis and design of electromagnetic devices

Finite element analysis in electromagnetic field

Electric Power quality; analysis&mitigation

Awards & Membership

Professional Membership:

1. IEEE Senior Member since 1995
2. Senior Member of Iranian Association of Electrical and Electronic Engineerings since 2001
3. Member of Board of Directors of Iranian Association of Electrical and Electronic Engineers- Isfahan branch
4. Member of Industry research board- Isfahan
5. Member of editorial board of Electrical Engineering Journal (IAEEE)

Awards:

- **National outstanding electrical engineering research award, 2004**
- Outstanding research faculty award, Isfahan University of Technology, 2002
- **Second prize paper winner of IEEE-IAS Conference, September 1990**
- Scholarship for the top class rank in EE class of 1979, Tehran University

Education

Academic Degrees

<p>Academic Position:</p>	<p>Professor</p>
<p>Academic Degree:</p>	<p>B. Sc :1980, Electrical Engineering, Tehran University, Iran</p> <p>M. Sc. :1985, Electrical Engineering, West Virginia University</p> <p>Ph. D. :1989, Electrical Engineering, Purdue University</p>
<p>Theses Title :</p>	<p>B. Sc:</p> <p>M. Sc:</p> <p>Ph. D :</p>