

Resume

Name: Liuchen Chang
Position: Professor, NSERC Chair in Environmental Design Engineering

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Education

Sept. 1987 - Sept. 1991	Queen's University, Kingston, Ontario	Ph.D.
Feb. 1982 - Dec. 1984	China Academy of Railway Sciences, Beijing, China	M.Sc.
Mar. 1978 - Jan. 1982	Northern Jiaotong University, Beijing, China	B.Sc.

Research Interests

Renewable energy conversion, distributed power generation, environmental design engineering, electrical machines, power electronics, numerical computation for electromagnetics, electric vehicle propulsion.

Employment

Mar. 1992 - Present	Working as professor and NSERC Chair in Environmental Design Engineering at the Department of Electrical Engineering, University of New Brunswick, Fredericton, N.B. E3B 5A3.
Aug. 1991 - Feb. 1992	Worked as a project engineer at Conceptor Industries Inc., 521 Newpark Blvd., Newmarket, Ontario L3Y 4X7.
Dec. 1984 - Aug. 1987	Worked as a research engineer at the Locomotive and Car Institute, China Academy of Railway Sciences, Beijing.

Courses Taught:

EE 2703	Introduction to Engineering Design
EE 3611	Electrical Machines I
EE 3622	Electrical Machines II
EE 4653	Power Electronics
EE 6613	Generalized Electrical Machine Theory
EE 6653	Power Electronics
EE 6693	Advanced Topics in Environmental Design Engineering
EE 6803	Finite Elements for Electromagnetics

Membership in Professional Societies:

Senior Member of IEEE (1999), Member (1992), Student Member (1988)
 Member of Association of Professional Engineers and Geoscientists of NB (1996)

Research Grants/contracts (as Principal Investigator in the past 6 years):

2004/2008	AIF Grant: Beyond Kyoto: Atlantic Sustainable Power R&D Initiatives
2004/2009	NSERC Discovery Grant: Novel buck-boost inverter
2004	CDEN Contract: Course modules for isolated power systems in remote communities

	and for distributed power generation
2003/2005	BNIF Grant: Development of a 25 kW variable speed small hydro unit
2003/2006	Sustainable Development Technology Canada Grant: Power electronic converter based interconnection technologies for distributed power generators
2003/2004	ARI Contract: Study of wind-diesel systems for remote communities
2003/2004	BNIF Grant: Development of PWM ac-dc converter for variable speed wind turbines
2003/2005	NRCan Research Grant: Two-phase wind turbine generator system
2001/2006	NSERC Chair in Environmental Design Engineering
2001/2003	NSERC Research Grant: 2-phase generator system for wind turbines
2001	NB Government S.E.E.D. program (research assistant)
2000	NB Government S.E.E.D. program (research assistant)
1999/2001	Canadian Foundation of Innovation Funding: Establishing a Test Facility for Wind and Solar Energy Conversion Systems
1999	NB Government S.E.E.D. program (research assistant)
1997/2001	NSERC Research Grant: Induction generators for wind turbines
1998/1999	UNB Research Grant: Development of ac-ac Converter
1996/2000	NSERC Strategic Grant: Synchronous generators for wind turbines

Papers Published in Journals:

1. Yaosuo Xue, Liuchen Chang, Soeren Baekhoej Kjaer, Josep Bordonau, and Toshihisa Shimizu, "Topologies of Single-Phase Inverters for Small Distributed Power Generators: An Overview," IEEE Transactions on Power Electronics, Vol. 19, No.5, Sept. 2004, pp.1305-1314.
2. Quincy Wang and Liuchen Chang, "An Intelligent Maximum Power Extraction Algorithm for Inverter-Based Variable Speed Wind Turbine Systems," IEEE Transactions on Power Electronics, Vol. 19, No.5, Sept. 2004, pp.1242-1249.
3. H. Madadi Kojabadi, L. Chang and T. Boutot, "Development of a Novel Wind Turbine Simulator for Wind Energy Conversion Systems Using an Inverter Controlled Induction Motor," IEEE Trans. on Energy Conversion, Vol. 19, No.3, Sept. 2004, pp.547-552.
4. Liuchen Chang, "Wind Energy Conversion Systems," IEEE Canadian Review, Spring 2002, pp.12-16.
5. Quincy Wang and Liuchen Chang, "PWM Control Strategies for Wind Turbine Inverters," Journal of Wind Engineering, Vol. 25, No.1, Jan. 2001, pp.33-40.
6. Hong Huang and Liuchen Chang, "Electrical Two-Speed Propulsion by Motor Winding Switches and its Control Strategies for Electric Vehicles," IEEE Trans. on Vehicular Technology, Vol.48, No.2, March 1999, pp.607-618.
7. K. Idir, L. Chang, H. Dai, "Error-Based Global Optimization Approach for Electric Motor Design," IEEE Transactions on Magnetics, Vol. 34, No. 5, Sept. 1998, pp.2861-64.
8. K. Idir, L. Chang, H. Dai, "Improved Neural Network Model for Electric Motor Design," IEEE Transactions on Magnetics, Vol. 34, No. 5, Sept. 1998, pp.2948-51.
9. Liuchen Chang, G. E. Dawson and T. R. Eastham, "Finite Element and Analytical Methods for Permanent Magnet Synchronous Motor Design," Electric Machines and Power Systems, Vol. 26, No. 5, June 1998, pp.465-476.
10. K. Idir, L. Chang, H. Dai, "A New Optimization Approach for Induction Motor Design Using Neural Networks," L'Algerian Journal of Technology (A.J.O.T) 1997.
11. Liuchen Chang, "Development of a Driver Board Power Supply for High Power IGBTs Used in Three-Phase Inverters", IEEE Aerospace and Electronic Systems Magazine, Vol.11, No.8, Aug. 1996, pp.24-28.
12. Liuchen Chang, "Improved FE Inductance Calculation for Electrical Machines," IEEE Transactions on Magnetics, Vol.32, No. 4, July 1996, pp.3237-3247.
13. Liuchen Chang, G. E. Dawson and T. R. Eastham, "Finite Element Analysis of Electric Machines: Post-Processing Methods", International Journal of Applied Electromagnetics In Materials, No. 5, 1994, pp.321-330.

14. Liuchen Chang, "Comparison of AC Drives for Electric Vehicles - A Report on Experts' Opinion Survey," IEEE Aerospace and Electronic Systems Magazine, Vol. 9, No. 8, Aug. 1994, pp.7-11.
15. Liuchen Chang, "Recent Developments of Electric Vehicles and Their Propulsion Systems," IEEE Aerospace and Electronic Systems Magazine, Vol. 8, No. 12, Dec. 1993, pp.3-6.
16. Liuchen Chang, Tony R. Eastham and Graham E. Dawson, "In-Situ Magnetization of NdFeB Magnets for Permanent Magnet Machines", IEEE Transactions on Magnetics, Vol. 27, No. 5, Sept. 1991, pp.4355-4359.
17. Liuchen Chang and Rongtai Hao, "Current Source Four Quadrant Converter and its Microprocessor Control System in Electrical Locomotives", Electrical Drive For Locomotives, No. 1, Jan. 1986.

Papers Published in Refereed Conference Proceedings:

1. L. Chang, Q. Wang, and P. Song, "Application of Finite Element Method in Design of A 50 kW Direct Drive Synchronous Generator for Variable Speed Wind Turbines," The 4th International Power Electronics and Motion Control Conference (IPEMC 2003), Xi'an, China, Aug. 14-17, 2004.
2. Y. Xue, L. Chang and P. Song, "Recent Developments in Topologies of Single-Phase Buck-Boost Inverters for Small Distributed Power Generators: An Overview, " The 4th International Power Electronics and Motion Control Conference (IPEMC 2003), Xi'an, China, Aug. 14-17, 2004.
3. J. Yin, L. Chang, C. Diduch, "Recent Developments in Islanding Detection for Distributed Power Generation," IEEE 2004 Large Engineering Systems Conference on Power Engineering (LESCOPE04), Halifax, July 2004.
4. J. Wang, L. Kang, L. Chang, B. Cao, D. Xu, "Energy Complementary Control of a Distributed Power Generation System Based on Renewable Energy," IEEE 2004 Large Engineering Systems Conference on Power Engineering (LESCOPE04), Halifax, July 28-30 2004.
5. Liuchen Chang, "Development of a Multi-Disciplinary Graduate Program: Master of Engineering in Environmental Studies at the University of New Brunswick," CDEN/RCCI Inaugural Conference on Engineering Design, Montreal, July 28-29, 2004.
6. Q. Zeng, and L. Chang, "A New Method for Three-Phase Voltage Detection and Protection Based on Reference Frame Transformation," IEEE Power Electronics Specialists Conference 2004, Aachen, Germany, June 21-24, 2004.
7. Q. Zeng, L. Chang, P. Song, "SVPWM-Based Current Controller with Grid Harmonic Compensation for Three-Phase Grid-Connected VSI," IEEE Power Electronics Specialists Conference 2004, Aachen, Germany, June 21-24, 2004.
8. Y. Xue and L. Chang, "Closed-Loop SPWM Control for Grid-Connected Buck-Boost Inverters," IEEE Power Electronics Specialists Conference 2004, Aachen, Germany, June 21-24, 2004.
9. H. Madadi Kojabadi, L. Chang, and R. Doraiswami, "Stability Conditions of Adaptive Pseudo-reduced-order Flux Observer for Vector-controlled Sensorless IM Drives," IEEE CCECE 2004, Niagra Falls, May 2004.
10. Liuchen Chang, "Switched Reluctance Motors: Small Motors of the Next Generation for Automobiles?" IEEE Vehicular Technology Conference 2003, Orlando, Oct. 7-9, 2003.
11. Liuchen Chang and Jarzy Muszynski, "Design of a 5-phase Permanent Magnet Brushless DC Motor for Automotives," IEEE Vehicular Technology Conference 2003, Orlando, Oct. 7-9, 2003.
12. H. Madadi Kojabadi, L. Chang and R. Doraiswami, "Novel Adaptive Observer for Very Fast Estimation of Stator Resistance in Sensorless Induction Motor Drives," IEEE Power Electronics Specialists Conference 2003, Mexico, June 15-19, 2003.
13. Liuchen Chang, "Atlantic Canada Sustainable Power Potential," The Kyoto Protocol and Environmental Policy in Atlantic Canada - Proceedings of UNB Climate Change Conference, Fredericton, NB, Canada, May 2, 2003.
14. H. Dehbonei, C. V. Nayar and L. Chang, "A New Modular Hybrid Power System," IEEE Int. Symposium on Industrial Electronics, Rio de Janeiro, Brasil, June 9-12, 2003.
15. L. Chang, "Development of a Series of Optically Isolated and Fibre-Optic Coupled Gate Drivers for Medium and High Power IGBTs," IEEE 2003 Large Engineering Systems Conference on Power

Engineering (LESCOPE03), Montreal, May 2003.

16. L. Chang and C. Diduch, "Issues of Interconnecting Distributed Power Generators with Electric Grids," IEEE 2003 Canadian Conference on Electrical and Computer Engineering (CCECE'03), Montreal, May 4 - 7, 2003.
17. H. Madadi Kojabadi, L. Chang and R. Doraiswami, "Effects of Adaptive PI Controller Gains on Speed Estimation Convergence and Noises at Sensorless Induction Motor Drives," IEEE 2003 Canadian Conference on Electrical and Computer Engineering (CCECE'03), Montreal, May 4 - 7, 2003.
18. H. Huang and L. Chang, "Error Driven PI Control of EV Propulsion Systems Based on Induction Motors," IEEE 56th Vehicular Technology Conference 2002, Vancouver, Sept. 24-28, 2002, Vol.3, pp.1686-1690.
19. H. Madadi Kojabadi and L. Chang, "Model Reference Adaptive System Pseudoreduced-Order Flux Observer for Very Low Speed and Zero Speed Estimation in Sensorless Induction Motor Drives," IEEE Power Electronics Specialists Conference 2002, Australia, June 2002.
20. Liuchen Chang, "Review of Distributed Power Generation Standards," IEEE 2002 Large Engineering Systems Conference on Power Engineering (LESCOPE02), Halifax, June 2002, pp. 36-40.
21. Madadi Kojabadi, R. Doraiswami and L. Chang, "Recent Progress in Sensorless Vector-Controlled Induction Motor Drives," IEEE 2002 Large Engineering Systems Conference on Power Engineering (LESCOPE02), Halifax, June 2002, pp.80-85.
22. Liuchen Chang and Quincy Wang, "Application of Finite Element Method in Design of a 50 KW Direct Drive Synchronous Generator for Variable Speed Wind Turbines," IEEE 2002 Canadian Conference on Electrical and Computer Engineering (CCECE'02), Winnipeg, May 13 - 15, 2002.
23. Tobie Boutot, Liuchen Chang, and David Luke, "A Low Speed Flywheel System for Wind Energy Conversion," IEEE 2002 Canadian Conference on Electrical and Computer Engineering (CCECE'02), Winnipeg, May 13 - 15, 2002.
24. Qingrong Zeng, Pinggang Song and Liuchen Chang, "A Photovoltaic Simulator Based on DC Chopper," IEEE 2002 Canadian Conference on Electrical and Computer Engineering (CCECE'02), Winnipeg, May 13 - 15, 2002.
25. Liuchen Chang, "A Switched Reluctance Motor Drive for Automotive Applications," IEEE MEPCON'2001, Egypt, Dec. 29-31, 2001, pp.443-447.
26. Carl Brothers and Liuchen Chang, "Performance Evaluation of a Newly Developed IGBT Inverter for Wind Turbines," 2000 International Wind Diesel Workshop, Charlottetown, Canada, Sept. 13-15, 2000.
27. Hong Huang and Liuchen Chang, "Energy-Flow Direction Control of Grid-Connected IGBT Inverters for Wind Energy Extraction," IEEE 2000 Canadian Conference on Electrical and Computer Engineering, Halifax, Canada, May 2000, Vol.1, pp.535-539.
28. Hong Huang and Liuchen Chang, "A New DC Link Voltage Boost Scheme of IGBT Inverters for Wind Energy Extraction," IEEE 2000 Canadian Conference on Electrical and Computer Engineering, Halifax, Canada, May 2000, Vol.1, pp.540-544.
29. Hong Huang and Liuchen Chang, "Energy Flow Principles of IGBT Inverters in Wind Energy Conversion Systems," IEEE 2000 Canadian Conference on Electrical and Computer Engineering, Halifax, Canada, May 2000, Vol.1, pp.545-549.
30. L. Chang, R. Doraiswami, T. Boutot and H. Kojabadi, "Development of a Wind Turbine Simulator for Wind Energy Conversion Systems," IEEE 2000 Canadian Conference on Electrical and Computer Engineering, Halifax, Canada, May 2000, Vol.1, pp.550-554.
31. H. Zhang, Q. Wang, M. Xu, L. Chang, "A New Approach of Continuous Waveform Modulation," IEEE 2000 Canadian Conference on Electrical and Computer Engineering, Halifax, Canada, May 2000.
32. Q. Zhang, Q. Wang, R. Hao, L. Chang, "A Novel Three-Phase Pulse Width Modulation (PWM) Technique Based on Co-related References," Telescon2000, Germany, 2000.
33. Carl Brothers and Liuchen Chang, "UNB's Test Facility for Wind and Solar Energy Conversion Systems Installed at AWTS," The 15th CanWEA Conference and Exhibition, Rismouski, Quebec, Sept. 27-29, 1999.

34. Carl Brothers and Liuchen Chang, "UNB's Test Facility for Wind and Solar Energy Conversion Systems Installed at AWTS," The 13th International Wind Diesel Workshop, Golden, Colorado, Oct. 21-22, 1999.
35. Q. Wang and L. Chang, "An Independent Maximum Power Extraction Strategy for Wind Energy Conversion Systems," IEEE 1999 Canadian Conference on Electrical and Computer Engineering, Edmonton, Canada, May 1999, pp.1142-1147.
36. L. Chang, C. Brothers, "Design of a 50 kW Synchronous Generator for Direct Drive Wind Turbines," 12th International Wind Diesel Workshop, Charlottetown, Canada, June 18-20, 1998.
37. L. Chang, "Development of a Single-Phase IGBT Inverter for Photovoltaic and Wind Turbine Applications," Renewable Energy Technologies in Cold Climates Conference 1998, Montreal, Canada, May 4-6, 1998, pp.351-356.
38. L. Chang, "Control of a Switched Reluctance Motor for Automotive Applications," IEEE 1998 Canadian Conference on Electrical and Computer Engineering Waterloo, Canada, May 24-28, 1998, pp. 393-396.
39. H. Huang, L. Chang, "The Sensitivity Analysis of Error Driven PI Control," IEEE 1998 Canadian Conference on Electrical and Computer Engineering Waterloo, Canada, May 24-28, 1998, pp.121-124.
40. T. Boutot, L. Chang, "Development of a Single-Phase Inverter for Small Wind Turbines," IEEE 1998 Canadian Conference on Electrical and Computer Engineering Waterloo, Canada, May 24-28, 1998, pp.305-308.
41. T. Boutot, L. Chang, "Development of a Voltage/Current/Power Instrument for Electrical Machines Laboratories," IEEE 1998 Canadian Conference on Electrical and Computer Engineering Waterloo, Canada, May 24-28, 1998, pp.301-304.
42. Q. Wang, L. Chang, "PWM Control Strategies for Wind Turbine Inverters," IEEE 1998 Canadian Conference on Electrical and Computer Engineering Waterloo, Canada, May 24-28, 1998, pp.309-312.
43. K. Idir, L. Chang, H. Dai, "Improved Neural Network Models for Induction Motor Design," Conference on the Computation of Electromagnetic Fields (COMPUMAG'97), Rio de Janeiro, Brazil, November 3-6, 1997, pp. 147-148.
44. K. Idir, L. Chang, H. Dai, "Error Based Global Optimization Approach for Electrical Machine Design," Conference on the Computation of Electromagnetic Fields (COMPUMAG'97), Rio de Janeiro, Brazil, November 3-6, 1997, pp. 511-512.
45. L. Chang, "Modeling of switched reluctance motors," 1997 IEEE Canadian Conference on Electrical and Computer Engineering, St. John's, NF, May 25-28, 1997.
46. H. Huang and L. Chang, "An error-driven controller for electric vehicle propulsion systems," 1997 IEEE Canadian Conference on Electrical and Computer Engineering, St. John's, NF, May 25-28, 1997.
47. K. Idir, L. Chang, H. Dai, "A new global optimization approach for induction motor design," 1997 IEEE Canadian Conference on Electrical and Computer Engineering, St. John's, NF, May 25-28, 1997.
48. H. Huang, L. Chang, "Test of Electrical Two-Speed Propulsion by Induction Motor Winding Switching for Electric Vehicles," IEEE 47th Annual International Vehicular Technology Conference, Phoenix, Arizona, May 4-7, 1997, Vol.3, pp.1907-1911.
49. K. Idir, L. Chang, H. Dai, "A New Optimization Approach for Induction Motor Design Using Neural Networks," COMEI'96 (2eme Conference sur l'Automatique Maghrebine I 'Electrotechnique et l'Electronique Industrielle, Tlemcen, Alger, Dec. 1996.
50. S. Xu, G. Gu, Z. Li, L. Chang, "Transient Electromagnetic Field in Turbine Generator," The 3rd International Conference on Electromagnetic Field Problems and Applications, Wu Han, China, Oct. 9-11, 1996.
51. Liuchen Chang, "Design Procedures of a Switched Reluctance Motor for Automobile Applications," 1996 Canadian Conference on Electrical and Computer Engineering, Calgary, May 1996, pp.947-950.
52. K. Idir, L. Chang and H. Dai, "A Neural Network Based Optimization Approach for Induction Motor Design," 1996 Canadian Conference on Electrical and Computer Engineering, Calgary, May 1996, pp.951-954.

53. H. Huang and L. Chang, "Simulation Study on the Membership Functions of the Basic Fuzzy Logic Controller for Electric Vehicle Propulsion Systems," 1996 Canadian Conference on Electrical and Computer Engineering, Calgary, May 1996, pp.1004-1007.
54. Hong Huang and Liuchen Chang, "Continuous Defuzzification of Fuzzy Logic Controller in Electric Vehicle Induction Motor Drive," 1995 Int. Conf. on Systems, Man and Cybernetics, Vancouver, Oct. 22-25, 1995, pp.2466-2471.
55. C. Ma, W. Li, Y. Yang and L. Chang, "Robot Motion Planning with Many Degrees of Freedom," 1995 Int. Conf. on Systems, Man and Cybernetics, Vancouver, Oct. 22-25, 1995, pp.892-897.
56. Q.Tan, W.Li, L.Chang, H.Huang, "An Hybrid Neuro-Fuzzy System for Robot Control," 1995 Int. Conf. on Systems, Man and Cybernetics, Vancouver, Oct. 22-25, 1995, pp.2916-2921.
57. Liuchen Chang, "Development of Switched Reluctance Motor Drives and the Applications in Automobiles", 1995 Canadian Conf. in Elec. and Comp. Engineering, Montreal, Sept 5-8, 1995, pp. 280-283.
58. Liuchen Chang, "Development of a Power Supply for High Power IGBTs Used in Three-Phase Inverters", 1995 Canadian Conf. in Elec. and Comp. Engineering, Montreal, Sept 5-8, 1995, pp.1128-1131.
59. K. Idir, L. Chang and H. Dai, "Induction Motor Design Using Neural Networks", 1995 Canadian Conf. in Elec. and Comp. Engineering, Montreal, Sept 5-8, 1995, pp.277-279.
60. Kamel Idir and Liuchen Chang, "The Effects of Ventilation and Mounting Holes on the Magnet Field of a Synchronous Generator", 1995 Canadian Conf. in Elec. and Comp. Engineering, Montreal, Sept 5-8, 1995, pp. 575-577.
61. A. M. Sharaf, H. Huang and L. Chang, "Power Quality and Nonlinear Load Voltage Stabilization Using Error Driven Switched Passive Power Filter," IEEE Int. Symp. on Industrial Electronics, Athens, July 10-14, 1995.
62. Song Xu, Liuchen Chang et al, "Digital Simulation and Experimental Verification of Transient Electromagnetic and Temperature Fields in Turbine Generator," COMPUMAG, Berlin, July 10-13, 1995.
63. H. Huang and Liuchen Chang, "Computer Simulation of Electrical Vehicle Tests," 1995 Summer Computer Simulation Conference, Ottawa, July 24-26, 1995.
64. Hong Huang and Liuchen Chang, "Improvement to the Starting Characteristic of Induction Motor Drives", Proc. of 1994 Int. Conference on Electric Machines (ICEM'94), Sept. 5-8, 1994, Paris, France, Vol. 1, pp. 112-117.
65. Liuchen Chang and Cecilia Ng, "A Solar Battery Charger with Improved Energy Utilization", 1994 Canadian Conference on Electrical and Computer Engineering, Halifax, Sept. 25-28, 1994.
66. Hossein Mokhtari and Liuchen Chang, "Control Strategies for a Novel Zero-Current Switching DC-DC Converter", 1994 Canadian Conference on Electrical and Computer Engineering, Halifax, Sept. 25-28, 1994.
67. Liuchen Chang, "Recent Developments of Electric Vehicles and Their Propulsion Systems", The 28th Intersociety Energy Conversion Engineering Conference (IECEC'93), Atlanta, USA, Aug. 8-13, 1993, Paper 93049, pp.2.205-2.210.
68. Liuchen Chang, "Finite Element Inductance Calculation for Electric Machines", The 3rd Int. Symposium on Antennas and EM Theory (ISAE'93), Nanjing, China, Sept. 6-9, 1993, pp.631-634.
69. Joe Khoury, Liuchen Chang and Adel Sharaf, "Multi-Level Bang Control of DC Motors Using a PLC", 1993 Canadian Conference on Electrical and Computer Engineering, Vancouver, Sept. 14-17, 1993, pp. 1053-1056.
70. Liuchen Chang, T. R. Eastham and G. E. Dawson, "Permanent Magnet Synchronous Motor Control: Hysteresis Control and Direct Torque Control", Proc of International Conference on Electrical Machines (ICEM'92), Sept.15-17, 1992, Manchester, UK, Vol. 3, pp. 918-922.
71. Liuchen Chang, T. R. Eastham and G. E. Dawson, "Permanent Magnet Synchronous Motor Modelling: Finite Element and Analytical Approaches", Proc. of International Conference on the Evolution and Modern Aspects of Synchronous Machines, Aug. 1991, Zurich, Switzerland.

72. Liuchen Chang, Graham E. Dawson and Tony R. Eastham, "Permanent Magnet Synchronous Motor Design: Finite Element and Analytical Methods", Proc. of Int. Conf. on Electrical Machines, Cambridge, USA, 13-15 Aug. 1990, Vol. 3, pp.1082-1089.
73. Liuchen Chang, Tony R. Eastham and Graham E. Dawson, "Permanent Magnet Synchronous Motor: Finite Element Torque Calculations", Proc. of IEEE Industry Application Society Annual Meeting, San Diego, USA, Oct. 1989, Vol. 1, pp.69-73.
74. Liuchen Chang, Rongtai Hao and Xibin Zhang, "A Computer Aided Optimal Parameter Design for a Current Source PWM AC-DC Converter", Proc. of Beijing Int. Conf. On Electrical Machines, Beijing, China, August 1987, Vol. 1, pp.376-379.
75. Liuchen Chang, Xibin Zhang and Rongtai Hao, "Computer Simulation and Vector Control to a Current Source PWM AC-DC Converter for Railway Traction", Proc. of IEEE Asian Electronics Conference, Hong Kong, September 1987.
76. Liuchen Chang and Youping Xiao, "Anti-disturbance Precautions in Microprocessor Control Systems", Proc. of China's 4th Electromagnetic Compatibility Conference, Shen Zhen, Nov. 1987.