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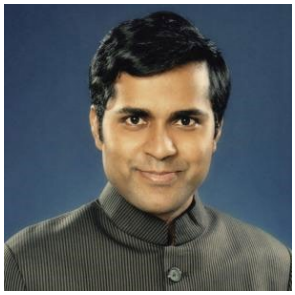

Education	**University of Victoria, Victoria, BC, Canada** **Ph.D.** in Power Electronics Advisor: Prof. Ashoka K. S. Bhat, *Life Fellow IEEE* Thesis topic: High-frequency transformer isolated power conditioning system for fuel cells to utility interface	Sept. 2004 - Aug 2008
	Indian Institute of Technology, BHU, Varanasi, India **M.Tech.** in Electrical Machines and Drives Advisor: Late Prof. Emeritus Som Nath Mahendra Thesis topic: Modeling and simulation of linear induction motor	July 2001 - Jan 2003
	Maharana Pratap University of Agriculture and Technology, Udaipur, India **B.Engg.** in Electrical Engineering Thesis topic: Development of C-band satellite TV receiver	July 1997 - June 2001
Postdoctoral Experience	**University of Illinois at Chicago, IL, USA** Postdoctoral research associate Advisor: Prof. Sudip K Mazumder, *Fellow IEEE*	Sept 2009 – Sept 2010
	University of Wuppertal, Wuppertal, Germany Postdoctoral research fellow Advisor: Prof. Emeritus Joachim Holtz, *Life Fellow IEEE* *Topic: Optimal low frequency pulse width modulation of medium voltage multilevel converters*	Sept-2008 – Aug 2009
Professional Experience	**Concordia University, Montreal, QC, Canada** Associate Professor, Electrical and Computer Engineering	March 2016-
	National University of Singapore, Singapore Assistant Professor, Electrical and Computer Engineering	Nov 2010 to Feb 2016
	University of Victoria, Victoria, BC, Canada Lecturer in Electrical and Computer Engineering	May to Dec 2007
	Mody Institute of Technology and Science, Lakshmangarh, India; Lecturer in Electrical Engineering	July 2003 – Aug 2004
	Maharana Pratap University of Agriculture and Technology, Udaipur, India Lecturer in Electrical Engineering	Feb to June 2003

Industry Experience

WEG Automation-Drives and Controls, Brazil
Consultant (Sept 2008 to Aug 2009)
Optimal Pulse Width Modulation of Multilevel Inverters Systems
Patents approved: EP2312739A1 and EP2312739B1; licensed to WEG.
WEG developed commercial 4.16 kV, 2MW neutral-point-clamped (NPC) 5-level inverter based induction motor drive system and up to 6.9 kV, 16 MW 9-level NPC inverter based induction motor drive system for clients in high power sectors. WEG documented above 99 percent efficiency, the best efficiency of any medium voltage drive currently available on the market, meaning customers can increase energy efficiencies in their application, reducing their environmental footprint and making associated cost savings. An average 1% improved efficiency than the other medium voltage drives in the market can mean an economy of up to US$ 50,000,00 per year.WEG has documented its suitability for a variety of industrial applications including pumps, fans, mills and agitators in the oil and gas, mining, minerals and metals, chemical, paper, plastics/rubber, and water sectors. The developed drive systems are running for these applications all over the world.

Hindustan Power, India
Consultant-Motors and Controls (July 2003-August 2004)
Implemented advanced digital control systems for drive systems.

Research Expertise and Interest

Soft-switching techniques for high-frequency power conversion
Power electronics and drives for ground vehicles, marine and aerospace applications
Novel pulse width modulation techniques
Innovative power electronics topologies
Resonant and PWM converters
Multilevel inverters and low frequency control for medium voltage applications
Optimal control of electrical drives , medium voltage high power industrial drives
Power electronics for renewables, energy storage, rural electrification, and microgrid
Wireless power transfer; G2V, S2V, and V2G

Research Area Developed

(1) Current-Fed Power Electronics Systems-High frequency Soft-switching PWM including bidirectional and three-phase
(2) Multilevel Inverters-fundamental frequency switching at medium voltage
(3) Wireless Power Transfer-Inductive and capacitive
(4) Control of AC Drives: Medium Voltage High Power Industrial Electrical Drives

Honors, Awards, and Fellowships

IEEE Bimal Bose Award for Industrial Electronics Applications in Energy Systems	2020
IEEE IAS Outstanding Area Chair Award (service award)	2020
IEEE IES Recognition Award (service award for contributions to the IES publications as EiC IES ITeN 2016-18)	2019
Prominent Lecturer (PL): IEEE Industry Applications Society	2019-21
Distinguished Lecturer (DL): IEEE Industry Applications Society	2017-18
Youngest DL of the IEEE IAS Society	
IET Power Electronics Premium Paper Award	2018
IEEE Transactions on Power Electronics, Best Paper	July 2018 Issue
IEEE IES David J Irwin Early Career Award	2017

IEEJ Isao Takahashi Power Electronics Award	2014
IEEE IAS Andrew W Smith Outstanding Young Member Award	2013
Third Prize Paper Award, IEEE ITEC India, Chennai	2015
Best Presentation Award at APEC (USA) and IECON (Japan)	2015
Marquis "Who's Who in the World",	2008
Marquis "Who's Who in America"	2008
Marquis "Who's Who in Science and Engineering"	2006
Thouvenelle Graduate Scholarship	2006-2007
University of Victoria Full Fellowship (PhD level)	2004-2005
GOLD MEDAL in M. Tech. (Electrical Engineering)	2003
MHRD and UGC Scholarship	2001-2003
IEEE IES Student Travel Grant to attend ISIE at France	2004
IEEE IES Student Travel Grant to attend ICIT at Slovenia	2003

Professional Membership

Institute of Electrical and Electronic Engineers (IEEE) since 2002
IEEE Industry Applications Society (IAS)
IEEE Industrial Electronics Society (IES)
IEEE Power Electronics Society (PELS)

Editorial Services

Paper Review Chair (eq. to co-EIC) – Industrial Automation and Control (2016-18), Renewable and Sustainable Energy Conversion Systems (2020-21): IEEE Transactions on Industry Applications

Editor-in-Chief: IEEE IES Technology News (ITeN) (2016-18)

Associate Editor – IEEE Transactions on Industrial Electronics (2014-19)

Associate Editor – IEEE Transactions on Industry Applications (2013-)

Associate Editor – IEEE Transactions on Transportation Electrification (2014-19)

Associate Editor – IEEE Journal of Emerging Selected Topic in Power Electronics (2013-19)

Associate Editor – IEEE Transactions on Vehicular Technology (2016-19)

Editor – IEEE Transactions on Sustainable Energy (2014-)

Associate Editor – IET Power Electronics (2015-19)

Guest Editorial (Special Issues)

1.	IEEE Transactions on Power Electronics Special Issue on Transportation Electrification and Vehicle Systems	vol. 28, no. 12, Dec 2013
2.	IEEE Journal of Emerging Selected Topics in Power Electronics Special Issue on Transportation Electrification	vol. 2, no. 3, Sept 2014
3.	IEEE Transactions on Industrial Electronics Special Issue on Industrial Electronics for Electric Transportation	vol. 62, no. 5, May 2015
4.	IEEE Transactions on Transportation Electrification Special Issue on Marine Systems Electrification	Vol 2, no 4, 2016
5.	IEEE Transactions on Transportation Electrification Special Issue on Wireless Charging Systems	Vol. 3, no 2, 2017
6.	IEEE Journal of Emerging and Selected topics in IE	

	Special Issue on Efficient, High Density and Reliable Enabling Technologies for Transportation Electrification **(Inaugural proceeding July 2020)**	July 2020
Administrative Positions/ Service	**IEEE IAS Award Department Chair**	2020-22
	IEEE IES Publication Committee Member	2016-till
	Panelist: National Science Foundation (NSF) Energy, Power, Control and Network (EPCN) onsite Review Panel, USA	2016
	Member-at-Large: IEEE IAS Executive Board	2017-19
	Vice Chair and Paper Review Chair: IEEE IAS Renewable and Sustainable Energy Conversion Systems Committee	2019-20
	Chair: IEEE IAS Industrial Automation and Control Committee **Chair:** IEEE IES Technical Committee on Transportation Electrification	2018-19 2016-17
	Vice Chair and Paper Review Chair: IEEE IAS Industrial Automation and Control Committee (IACC)	2016-18
	Secretary: IEEE IAS Renewable and Sustainable Energy Conversion Systems Committee, (RSECSC)	2016-17
	Member: IEEE IAS Andrew W Smith Outstanding Young Member Award Committee	2015-19
	Award Chair: Industrial Automation and Control, Annual Meeting prize paper awards	2014-19
	AdCom Member with voting rights: IEEE IES Society	2016-17
	Social Media Editor-in-Chief: IEEE Transportation Electrification Community	2016-till
	Secretary: IEEE IAS Industrial Automation and Control Committee (IACC)	2014-15
	Vice-Chair: IEEE IES Technical Committee on Transportation Electrification	2014-15
	Editor-in-Chief: IEEE IES Technology News (ITeN)	2016-18
Conference Organizing Committee	**General Chair:** IEEE PEDES 2020, Jaipur, India.	
	General Chair: IEEE STPEC 2020, Nagpur, India	
	General Chair: IEEE PESGRE 2020, Kochi/Cochin, India.	
	Technical Program Chair: IEEE ITEC India 2019, Bangalore, India.	
	Track Chair: IEEE APEC 2019, Anaheim, USA	
	Technical Program Chair: IEEE PEDES 2018, Chennai, India	
	Coordinator, Student Travel Awards, IEEE PEDES 2018, Chennai, India	
	Track Chair: IEEE IECON 2018, Washington, DC, USA	
	Technical Program Chair: IEEE IAS Annual Meeting 2018, Portland, USA	
	Vice-Chair, IEEE ECCE 2018, Portland, USA	
	Track Chair: IEEE APEC 2018, San Antonio, USA	
	Technical Program Chair: IEEE ITEC INDIA 2017, Pune, India	
	Technical Program Chair: IEEE ICIT 2017, Toronto, Canada	

Vice-Chair, IEEE ECCE 2017, Cincinnati, OH, USA
Track Chair, IEEE ISIE 2017, Edinburgh, UK
Track Chair: IEEE APEC 2017, Tempa, FL, USA
Technical Program Chair: IEEE PEDES 2016, Trivandrum, India
Track Chair: IEEE IECON 2016, Florence, Italy.
Technical Program Committee Member: IAS Annual Meeting 2016, Portland, USA
Topic Chair: Fuel cells, Energy Storage: ECCE 2016, Milwaukee, USA
Track Chair: IEEE ISIE 2016, Santa Clara, USA
Track Chair: IEEE APEC 2016, Long Beach, USA
Track Chair: IEEE IECON 2015, Yokohama, Japan
Technical Program Committee Member: IAS Annual Meeting 2015, Dallas, USA
Students Activities Co-Chair: IEEE ECCE 2015, Montreal, Canada
Academia-Industry Interface Committee Chair: IEEE ITEC India 2015, Chennai, India
Track Chair: IEEE ISIE 2015, Brazil; IEEE APEC 2015, Charlotte, USA
Track Chair: IEEE PEDES 2014, Mumbai, India; IEEE IECON 2014, Dallas, USA
Technical Program Committee Member: IAS Annual Meeting 2014, Vancouver, Canada
Topic Chair: Industrial Drives, IEEE ECCE 2014, Pittsburgh, USA
Track Chair: IEEE ITEC Asia and Pacific 2014, Beijing, China
Track Chair: IEEE ISIE 2014, Istanbul, Turkey
Track Chair: IEEE IECON 2013, Vienna, Austria
Topic Chair: Distributed Generation and Microgrids, IEEE ECCE 2013, Denver, USA
Track Chair: IEEE PEDS 2013, Kitakyushu, Japan
Track Chair: IEEE IECON 2012, Montreal, Canada
Tutorial Chair: IEEE ICSET 2012, Kathmandu, Nepal
Tutorial Chair: IEEE PEDS 2011, Singapore

Reviewer Funding agencies

- 2016 National Science Foundation (NSF), US Onsite Review Panelist
- Qatar National Research Foundation (QNRF)-reviewer
- 2012 National Research Foundation, Singapore-reviewer
- 2017 Chilean Council of Science and Technology-reviewer
- National Science Centre, Poland 2018-reviewer

Workshop

NUS Singapore-IITB Mumbai Workshop on Joint PhD Program; 2014-15
Coordinator-faculty of Engineering, NUS, Singapore

Patent

EP09171698.5, MERH Ref.: 200621EP: Optimal Pulsewidth Modulation for Multilevel Inverter Systems. **2013**
Inventor: P J Torri, Akshay K Rathore, T. Boller and. J. Holtz, and Nicholas Oikonomou

Journals Published (90 IEEE Transactions)

1. V. Ratnam, K. Gnana, P. Xuewei, B. L. Narasimharaju, M. Bhukya, A. Banerjee, R. Sharma, and A. K. Rathore, "State-of-the-art power electronics systems for solar-to-grid integration," *Solar Energy (Elsevier),* vol.210, pp. 128-148, Nov. 2020.
2. S. Tandon and A. K. Rathore, "Novel series LC resonance-pulse based ZCS current-fed full-bridge dc-dc converter: analysis, design and experimental results," *IEEE Transactions on Power Electronics,* vol. 36, no 2, pp 1844-1855, Feb. 2021.
3. S. Gangavarapu and A. K. Rathore, "A novel transformerless single-stage grid connected solar inverter," *IEEE Journal of Emerging and Selected Topics in Industrial Electronics,* DOI: 10.1109/JESTPE.2020.3007556 (early access)
4. S. Gangavarapu and A. K. Rathore, "A three-phase single-sensor based Cuk-derived PFC converter with reduced number of components for more electric aircraft, " *IEEE Transactions on Transportation Electrification,* DOI: 10.1109/TTE.2020.2988154.
5. S. Tandon and A. K. Rathore, "Analysis and design of series LC resonance-pulse based zero-current-switching current-fed half-bridge DC-DC converter," *IEEE Transactions on Industrial Electronics,* DOI: 10.1109/TIE.2020.3005104 (early access).
6. A. R. Gautam, D. M. Fulwani, R. R. Makineni, A. K. Rathore and D. Singh, "Control strategies and power decoupling topologies to mitigate 2ω-ripple in single-phase inverters: a review and open challenges," *IEEE Access*, vol. 8, pp. 147533-147559, 2020.
7. M. Sharma, B. S. Rajpurohit, S. Agnihotri and A. K. Rathore, "Development of fractional order modeling of voltage source converters," *IEEE Access*, vol. 8, pp. 131750-131759, 2020.
8. K. Khatun, V. R. Vakacharla, K. Akhil, and A. K. Rathore, "Small Signal analysis and control of snubberless naturally-clamped soft-switching current-fed push-pull dc/dc converter," *IEEE Trans. on Industry Applications,* vol. 56, no. 4, pp. 4299-4308, July-Aug. 2020
9. K. Khatun, V. V. Ratnam, A. K. Rathore, and B. L. Narasimharaju, "Small-signal analysis and control of soft-switching naturally clamped snubberless current-fed half-bridge DC/DC converter. *Appl. Sci.* 2020, *10*, 6130.
10. A. Dixit, K. Pande, S. Gangavarapu, and A. K. Rathore, "DCM based bridgeless PFC converter for EV charging application," IEEE Journal of Emerging and Selected Topics in Industrial Electronics (in press), vol. 1, no. 1, pp. 57-66, July 2020.
11. N. Rathore, D. Fulwani, and A. K. Rathore, "Event-triggered sliding mode control for light load efficiency improvement in power converters," *Control Engineering Practice (Elsevier),* vol. 100, July 2020.
12. V. Ratnam and A. K. Rathore, "A simple technique for fundamental harmonic approximation analysis in parallel and series-parallel resonant converters," *IEEE Transactions on Industrial Electronics,* vol. 67, no. 11, pp. 9963-9968, Nov. 2020.
13. V. Ratnam and A. K. Rathore, "Analysis and design of current-fed three-phase isolated LCC-T Resonant Converter for low-voltage high-current applications," *IEEE Transactions on Industry Applications,* vol. 55, no. 6, Nov-Dec 2019, pp. 6527-6537.
14. S. Gangavarapu, A. K. Rathore, and V. Khadkikar, "High-efficiency three-phase single-stage isolated flyback-based PFC converter with a novel clamping circuit," *IEEE Transactions on Industry Applications,* vol. 56, no. 1, Jan-Feb 2020, pp. 718-729.
15. N. Rathore, S. Gangavarapu, D. Fulwani, and A. K. Rathore, "Emulation of loss free resistor for single-stage three-phase PFC converter in electric vehicle charging application," *IEEE Transactions on Transportation Electrification,* vol. 6, no. 1, March 2020, pp. 334-345.

16. HSVS K Nunna, A. Sesetti, A. K. rathore, and S. Doolla, "Multi-Agent based Energy trading platform for energy storage systems in distribution systems with inter-connected microgrids," *IEEE Transactions on Industry Applications,* vol. 56, no. 3, May-June 2020, pp. 3207-3217.
17. N. Rathore, D. Fulwani, A. K. Rathore, and A. R. Gautam, "Adaptive sliding mode based loss-free resistor for power-factor correction application," *IEEE Transactions on Industry Applications,"* vol. 55, no. 4, July/Aug 2019, pp. 4332-4342.
18. P. Xuewei, H. Li, Y. Liu, T. Zhao, C. Ju, and A. K. Rathore, "An overview and comprehensive comparative evaluation of current-fed isolated bidirectional dc/dc converters," *IEEE Transactions on Power Electronics*, vo. 35, no. 3, March 2020, pp 2737-2763.
19. S. Gangavarapu and A. K. Rathore, "A three-phase single-stage isolated flyback-based PFC converter with leakage energy recovery clamping circuit," *IEEE Transactions on Transportation Electrification,* vol. 5, no. 4, Dec 2019, pp 1155-1168.
20. G. K. Kulothungan[†], A. K. Rathore, J. Rodriguez, and D. Srinivasan, "Fundamental device switching frequency control of current-fed nine-level inverter for solar applications," *IEEE Transactions on Industry Applications,* vol. 56, no. 2, March-April 2020, pp. 1839-1849.
21. G. K. Kulothungan[†], A. Edpuganti[†], A. K. Rathore, J. Rodriguez, and D. Srinivasan, "Hybrid SVM-SOPWM modulation of current-fed three-level inverter for high power applications," *IEEE Transactions on Power Electronics, IEEE Transactions on Industry Applications,"* vol. 55, no. 4, July/Aug 2019, pp. 4344-4358.
22. V. Ratnam and A. K. Rathore, "Current-fed Isolated LCC-T Resonant Converter with ZVS and improved and Improved Transformer Utilization," *IEEE Transactions on Industrial Electronics*, vo. 66, no. 4, April 2019, pp. 2735-2745.
23. S. Gangavarapu and A. K. Rathore, "Three-phase Buck-Boost Derived PFC Converter for More Electric Aircraft," *IEEE Transactions on Power Electronics,* vol. 34, no. 7, July 2019, pp. 6264-6275.
24. H. Bai, C. Liu, D. Paire, F. Gao, and A. K. Rathore, "An FPGA-based IGBT Behavioral Model with High Transient Resolution for Real-Time Simulation of Power Electronic Circuits," *IEEE Transactions on Industrial Electronics,* vo. 66, no. 8, Aug 2019, pp. 6581-6591.
25. S. Gangavarapu, A. K. Rathore, and D. Fulwani, "Three Phase Single Stage Isolated Cuk based PFC Converter," *IEEE Transactions on Power Electronics,* vol. 34, no. 2, Feb 2019, pp. 1798-1808.
26. V. Ratnam and A. K. Rathore, "Isolated Soft Switching Current fed LCC-T Resonant DC-DC converter for PV/Fuel Cell Applications," *IEEE Transactions on Industrial electronics*, vol. 66, no. 9, Sept 2019, pp. 6947-6958**.**
27. P. Xuewei[†] and A. K. Rathore, "Electrolytic capacitorless current-fed single-phase pulsating DC link inverter," *IEEE Transactions on Vehicular Technology,* vol. 17, no. 5, May 2018, pp. 3900-3908.
28. S. Samanta and A. K. Rathore, "Small Signal Modeling and Closed loop Control of Parallel-Series-Series Resonant Converter for Wireless Inductive Power Transfer," *IEEE Transactions on Industrial Electronics, vol. 66,* no. 1, Jan 2019, pp. 172-182.
29. S. Samanta*and A. K. Rathore, "Analysis and Design of Load Independent ZPA Operation for P/S, PS/S, P/SP and PS/SP Tank Networks in IPT Applications," *IEEE Transactions on Power Electronics*, vo. 33, no. 8, Aug 2018, pp. 6476-6482.

30. D. K. Dheer, O. Kulkarni, S. Doolla, and A. K. Rathore, "Effect of reconfiguration and meshed networks on small signal stability margin of droop-based islanded microgrids," *IEEE Transactions on Industry Applications,* vol. 54, no. 3, May/June 2018, pp. 2821-2833.
31. P. Xuewei[†], A. Ghoshal[!], Y. Liu, Q. Xu, and A. K. Rathore, "Hybrid modulation based bidirectional electrolytic capacitor-less three-phase inverter for fuel cell vehicles: analysis, design, and experimental results," *IEEE Transactions on Power Electronics*, vol. 33, no. 5, May 2018, pp. 4167-4180.
32. S. Samanta*and A. K. Rathore, "A New Inductive Power Transfer Topology Using Direct AC-AC Converter with Active Source Current Waveshaping," *IEEE Transactions on Power Electronics*, Vol. 33, no. 7, pp. 5565-5577.
33. S. Pang, H. Yigeng, L. Guo, B. N. Mobarakeh, F. Gao and A. K. Rathore, "Stability analysis and active stabilization of on-board DC power converter system with input filter," *IEEE Transactions on Industrial Electronics*, vol. 65, no. 1, 2018, pp. 790-798.
34. V. K. Kanakesh[!], D. B. Yelaverthy[!], A. Ghoshal[!], A. K. Rathore, and R. Mahanty, "Analysis and Implementation of Closed Loop Control of Electrolytic Capacitorless Six Pulse DC Link Bidirectional Three-phase Grid-Tied Inverter," *IEEE Transactions on Industry Applications, vol. 54, no. 1,* Jan/Feb 2018, pp. 539-550.
35. S. Bal[†], D. B. Yelaverthy[!], A. K. Rathore, and D. Srinivasan, "Improved modulation strategy using dual phase shift modulation for active commutated current-fed dual active bridge," *IEEE Transactions on Power Electronics*, vol. 33, no. 7, Sept. 2018, pp. 7359-7375.
36. R. S. Krishna Moorthy[†], and A. K. Rathore, "Impulse commutated high-frequency soft-switching modular current-fed three-phase dc/dc converter for fuel cell applications," *IEEE Transactions on Industrial Electronics*, vol 65, no 8, August 2017, pp. 6618-6627.
37. A. Ghoshal[!], P. Xuewei[†], A. K. Rathore, "Analysis and design of closed loop control of electrolytic capacitor-less six-pulse DC link three-phase inverter, "*IEEE Transactions on Industry Applications*, vol. 53, no. 5, Sept/Oct 2017, pp. 4957-4964.
38. S. Samanta*, A. K. Rathore, and D. Thrimawithana, "Bidirectional current-fed-half-bridge (C)(LC) – (LC) configuration for inductive wireless power transfer system," *IEEE Transactions on Industry Applications*, vol. 53, no. 4, July/Aug 2017, pp. 4053-4062.
39. S. Samanta*, A. K. Rathore, and D. Thrimawithana, "Analysis and design of current-fed half-bridge (C)(LC)-(LC) resonant topology for inductive wireless power transfer application," *IEEE Trans on Industry App.*, vol. 53, no. 4, July/Aug 2017, pp. 3917-3926.
40. C. Buccella, C. Cecati, M. G. Simoroni, G. K. Kulothungan[†], A. Edpuganti[†], and A. K. Rathore, " A selective harmonic elimination method for five-level converters for distributed generation," *IEEE Journal of Emerging Selected Topics in Power Electronics,* vol 5, no 2, June 2017, pp. 775-783.
41. G. K. Kulothungan[†], A. Edpuganti[†], A. K. Rathore, and D. Srinivasan, "Modified synchronous pulse width modulation of current-fed five-level inverter for solar integration," *IEEE Trans on Power Electronics, vol*. 32, no. 5, May 2017, pp. 3370-3381.
42. G. K. Kulothungan[†], A. Edpuganti[†], A. K. Rathore, J. Rodriguez, and D. Srinivasan, "Current-fed multilevel converters: an overview of circuit topologies, modulation

techniques, and application," *IEEE Transactions on Power Electronics, IEEE Transactions on Power Electronics, vol*. 32, no. 5, May 2017, pp. 3382-3401.

43. R. S. Krishna Moorthy[†], and A. K. Rathore, "Analysis and design of impulse commutated zero current switching single inductor current-fed push-pull converter," *IEEE Transactions on Industry Applications*, vol 53, no 2, April 2017, pp 1517-1526.

44. D. Chakraborty[†], E. Breaz, A. K. Rathore, and F. Gao, "Parasitics assisted soft-switching and secondary modulated snubberless camping current-fed bidirectional voltage doubler for fuel cell vehicles," *IEEE Transactions on Vehicular Technology*, vol 66, no 2, Feb 2017, pp. 1053-1062.

45. A. Edpuganti[†] and A. K. Rathore, "Optimal pulsewidth modulation for common-mode voltage elimination of medium-voltage modular multilevel converter fed open-end stator winding induction motor drives," *IEEE Transactions on Industrial Electronics*, vol 64, no 1, Jan 2017, pp 848-856.

46. A. Anzalchi, A. Sarwat, and A. K. Rathore, "A new topology of higher order power filter for single-phase grid-tied voltage source inverters," *IEEE Transactions on Industrial Electronics*, vol 63, no 12, Dec 2016, pp. 7511-7522.

47. R. K. Surapaneni[†], D. B. Yelaverthy[!], and A. K. Rathore, "Cycloconverter based double-ended microinverter topologies for solar photovoltaic ac (PVAC) module,"*IEEE Journal of Emerging Selected Topics in Power Electronics*, vol. 4, no. 4, 2016, pp. 1354-1361.

48. G. K. Kulothungan[†], A. Edpuganti[†], A. K. Rathore, D. Srinivasan, C. Cecati, and C. Buccella, "Optimal low switching frequency pulse width modulation of current-fed three-level converter for solar power integration," *IEEE Transactions on Industrial Electronics, vol. 63, no. 11, Nov 2016, pp. 6877-6886.*

49. S. Bal[†], A. K. Rathore, and D. Srinivasan, "Naturally commutated current-fed three-phase bidirectional soft-switching dc-dc converter with 120° modulation technique," *IEEE Transactions on Industry Applications, vol 52, no 5, Oct 2016, pp 4354-4364.*

50. S. Samanta* and A. K. Rathore, "Wireless power transfer (WPT) technology using full-bridge current-fed topology for medium power applications," *IET Power Electronics,* vol 9, no. 9, 2016, pp. 1903-1913.

51. A. Edpuganti[†] and A. K. Rathore, "Optimal pulsewidth modulation of medium-voltage modular multilevel converter," *IEEE Transactions on Industry Applications*, vol. 52, no. 4, Aug 2016, pp. 3435-3442.

52. S. Bal[†], A. K. Rathore, D. Srinivasan, "Naturally clamped snubberless soft-switching bidirectional current-fed three-phase push-pull dc/dc converter for dc microgrid application," *IEEE Transactions on Industry Applications*, vol. 52, no. 2, March/April 2016, pp. 1577-1587.

53. R. S. Krishna Moorthy[†] and A. K. Rathore, "Impulse commutated zero current switching current-fed three-phase dc/dc converter," *IEEE Transactions on Industry Applications*, vol. 52, no. 2, March/April 2016, pp. 1855-1864.

54. D. R. Patil[!], A. K. Rathore, and D. Srinivasan, "A non-isolated bidirectional soft-switching current-fed LCL resonant dc/dc converter to interface energy storage in dc microgrid," IEEE Transactions on Industry Applications, vol 52, no. 2, March/April 2016, pp. 1711-1722.

55. S. K. Mishra, R. Adda, S. Sekhar, A. Joshi, and A. K. Rathore, "Power transfer using portable surfaces in capacitively coupled power transfer technology," IET Power Electronics, vol 9, no 5, 20 April 2016, p. 997 – 1008.

56. R. S. Krishna Moorthy[†] and A. K. Rathore, “Soft switching non-isolated current-fed inverter for PV/fuel cell applications,” *IEEE Transactions on Industry Applications*, vol. 52, no. 1, Jan 2016, pp. 351-359.
57. S. Samanta*, and A. K. Rathore, “A new current-fed topology with CLC transmitter and LC receiver for inductive wireless power transfer application: analysis, design, and experimental results,” IEEE Transactions on Transportation Electrification, vol. 1, no. 4, Dec 2015, pp. 357-368.
58. A. Edpuganti[†] and A. K. Rathore, “A survey of low switching frequency modulation techniques for medium-voltage multilevel converters," IEEE Transactions on Industry Applications, vol. 51, no. 5, Sept 2015, pp.4212-4228.
59. R. K. Surapaneni[†], and A. K. Rathore, " A single stage CCM Zeta microinverter for solar photovoltaic ac module," IEEE Journal of Emerging Selected Topics in Power Electronics, vol. 3, no. 4, Dec 2015, pp. 892-900.
60. A. Edpuganti[†]* and A. K. Rathore, “Fundamental switching frequency optimal pulse width modulation of medium voltage cascaded seven-level inverter," IEEE Transactions on Industry Applications, vol. 51, no. 4,July 2015, pp. 3485-3492.
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Tutorial

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2.	Soft-switching current-fed dc/dc converters for distributed generation and electric transportation	IEEE ICAEE 2014 India
3.	Soft-switching current-fed converters	IEEE PEDES 2012 India

	4. Current-fed power converters for renewable energy, distributed generation, and clean transportation	IEEE ISIE 2012 China
	5. High-frequency soft-switching current-fed converters for low voltage high current applications: growth, merits, challenges and applications	IEEE ICSET 2012 Nepal
Industry Lectures	1. Novel snubberless naturally clamped soft-switching bidirectional current-fed dc/dc converters, at **Delta-Q Technologies, Canada.**	Vancouver, 2012
	2. Novel snubberless naturally clamped soft-switching bi-directional current-fed dc/dc converters, **Schneider Electric, Canada**	Vancouver, 2012 PELS/IAS Chapter
	3. Optimal PWM control of medium voltage drives using multilevel inverters at low switching frequency, **General Electric, India**	Bangalore, 2009
	4. Comparison of soft-switched dc-dc converters and design & control of wide range ZVS dc-dc converter, **ABB, Switzerland**	Baden, 2009
	5. Low frequency and high frequency power electronics converters for renewables and electrical drives, **ABB, Chennai, India**	Chennai 2015
Keynotes Invited talks	1. Advance soft-switching current-fed converters for low voltage high current applications	IEEE ICPEICES 2016, New Delhi, July 2016
	2. New classes of soft-switching current-fed converters	IIT New Delhi, India, July 2016
	3. Zero current commutated unidirectional and bidirectional soft-switching current-fed converters	MNIT Jaipur, India July 2016
	4. Naturally clamped snubberless bidirectional dc/dc converters	VIT Vellore, India, Jan 2015
	5. Future hybrid-grid based residential smart energy system: idea of smart-grid, *Rajasthan Technical University*, *India*	Jaipur, India, 2012
	6. Possible renewable-to-grid integration schemes based on power conversion configurations*, Symposium on Information Technology for Smart Grid Systems, ASTAR*, *Singapore*	Singapore, 2010
	7. High-frequency soft-switching power electronics systems for renewable energy based power system, NUS Singapore,	Singapore July 2010
	8. MATLAB based analysis of linear induction motor based traction system, *Short term course on LIM based metro, organized by Indian Railway Institute of Electrical Engineering, Nasik, India*	Nasik, 2003
Book Chapters	Power Conversion and Control for Fuel Cell Systems in Transportation and Stationary Power Generation ***Authors: Kaushik Rajashekara and Akshay Kumar Rathore***	**CRC Press (2017)**
	Power Electronic Applications in DG, Control issues in DG, Storage Systems for DG, Grid codes for DG, Power Quality issues, DG in electricity markets ***Authors: Akshay Kumar Rathore and Prasanna Rajagopal***	**Springer (2017)**

Lab Manual	Solar Panel Characterization with effects of shading and intensity, MPPT Tracking, and Battery Charging	**NUS**
Research Grants and Consultancy Projects	1. An innovative mechanism and framework for vehicle-to-vehicle power transfer; CIRA, KUST, Abu Dhabi, UAE (04/19-03/22)	C$ 1M (10% share)
	2. Cooperative Micro Grids Integrated Smart Electric Transportation Systems (CMGISETS): Coordinated Technologies for Seamless Energy Management (MNIT Jaipur India, Concordia University Montreal Canada, UNSW Australia); **SPARC India (**04/19-03/21)	C$190,000 (share C$ 20k)
	3. Design and Development of High Efficient Switched Reluctance Motor (SRM) based Solar Photovoltaic (SPV) Water Pumping System (WPS) (NIT Warangal India and Concordia University, Montreal Canada); **DST-IMPRINT-IIC, India (**09/19-08/21)	C$ 108,000
	4. Design and development of new high gain transformer-less inverter topology for PV based grid-tie applications (NIT Warangal India, Concordia University, Montreal Canada, NCSU, Raleigh, USA, UH, Houston, USA); **SPARC India (**04/19-03/21)	C$ 182,200 (share C$ 20k)
	5. Mix-Energy-Source Electric Vehicle Charging System Design and Its Impact on Indian Smart-Distribution-Grid (IIT Kanpur India, IIT Kharagpur India, IIT (BHU) Varanasi India, Concordia University Canada, Imperial College UK, University of North Texas USA, VirginiaTech, USA. (06/2018-05/2021)	C$ 815,700 (faculty and student exchange)
	6. Faculty Research Support for extensive graduate supervision (05/2016-04/2021)	C$250,000 (100% PI)
	7. Facility Optimization Program (Equipment) 2019	C$ 20,000 (co-PI)
	8. ENCS Capital Grant (Equipment) 2019	C$10,000 (PI)
	9. High Density Wide Band Gap Based Variable Frequency Power Factor Correction AC/DC Rectifier for More Electric Aircraft, **IEEE (USA)** (Oct 2017-Sept 2019)	C$32,000 (100%) Role PI
	10. Power Conversion, Pulse With Modulation, and Integration Techniques for All Electric Vehicles **NSERC Discovery, Canada** (April 2017-March 2022)	C$185,000 (100%) Role co-PI
	11. Innovative power electronics and modulation techniques for electric, more electric, and hybrid transportation, **NSERC Discovery, Canada** (April 2016-March 2017)	C$31,000 (100%) Role-PI
	12. Emulation and design of electric and hybrid electric vehicle motor drive systems, **NSERC CRD, Canada** (Sept 2016-Aug 2019)	C$ 681,900 (33%) Role co-PI
	13. Wireless recharging of electrical vehicles and optimal control of medium voltage multilevel inverters, **Concordia University, Canada** (April 2016-March 2019)	C$100,000 (100%) Role PI
	14. Residential utility interfaced smart hybrid energy system, **Ministry of Education (MOE) Tier1, Singapore** (Jan 2011-Dec 2013)	S$179,950$ (100%) Role-PI
	15. Solar integrated micro solid state transformer, **Ministry of Education (MOE) Tier 1, Singapore** (March 2013 to Feb 2016)	S$134,500 (100%) Role-PI

	16. Dynamic optimization and energy management for smart grids, **Energy market Authority (EMA), Singapore** (2014-2016)	S$1.57M (25%) Role-Co-PI
	17. Intelligent power management system for electric propulsion based marine vessels for improving reliability, operational cost, performance and efficiency operating under different operating conditions, **Singapore Maritime Institute (SMI), Singapore** (Sept 2014 – Aug 2017)	S$805,600 (30%) Role- Co-PI
	18. Fault Tolerant Capacitorless Three-phase Inverter for Electric and Hybrid Electric Vehicles with Reduced Magnetics & Electrolyte Volume and Device Count, **Singapore MIT Alliance for Research and Technology (SMART)** (March 2014-Feb 2016)	S$205,000 (100%) Role-PI
	19. Modular Current-Fed Technology for High Efficiency Convenient Wireless Charging, **Ministry of Education (MOE) Tier 1, Singapore** (March 2014-Feb 2017)	S$152,000 (100%) Role-PI
	20. Multi-level Medium Voltage Drives System for Marine Applications, **Economic Development Board (EDB), Singapore** (July 2013 – Dec 2016)	S$50,000 (50%) Role-Co-PI
	21. Solar Energy Harvesting and Active Energy Management System for Nano-Satellites, Ministry of Education (MOE) Tier 1, Singapore (Aug 2013 – July 2016)	S$173,400
	22. Lithium-ion and Sodium-ion Battery for Large Scale Stationary Storage Applications, Phase 1: Optimization of Full Cell Fabrication; **NUS Singapore**	S$645,000 Collaborator
	23. Comparison of bidirectional dc/dc converters and design and development of an efficient/cost-effective converter for solar-UPS. **Robert-Bosch, Singapore.** (Dec 2014-July 2015)	S$30,000 (100%) Role-PI

Department/ faculty Service	**New Competitions Committee (Faculty)**	June 2020-
	Faculty Council Member (ECE representative)	June 2020-
	Graduate Program Director (MASc studies) and Graduate Awards Committee Chair	July 2020-
	Chair: PhD Defense Chairing Committee (faculty)	Jan 2019-
	Chair: MASc Defense and M.Engg. Seminar	Jan 2019-May 2020
	Member: ECE Graduate Committee, Concordia, Canada	April 2016-
	Member – ECE Graduate Studies Committee, Concordia, Canada	July 2019-
	Chair: ECE Graduate Awards Committee, Concordia, Canada	2017
	Faculty Coordinator – NUS-IIT Mumbai Joint PhD Program *Organized two faculty level workshops*	2014-15
	Secretary: ECE Department Management Committee, NUS Singapore	2014-15
	Member – ECE Department Outreach Committee, NUS Singapore	2012-15
	Power and Energy Research Area Representative: ECE Department Research Publicity Committee, NUS Singapore	2014-15

Graduate Students Supervised	PhD Graduated/Students	Present Position
	Dr. Pan Xuewei (2014) **Thesis Topic:** Soft-switching current-fed power converters for low voltage high current applications ***2016 IEEE IAS International Graduate Thesis Award-3rd place***	Associate Professor Harbin Institute of Technology, China
	Dr. Amarendra Edpuganti (2015) **Thesis Topic:** Optimal pulse width modulation of multilevel inverters for medium voltage drives ***2016 IEEE IAS International Graduate Thesis Award-2nd place***	Scientist, ABB Sweden
	Dr. Radha Sree Krishna Moorthy (2016) **Thesis Topic:** Analysis and design of impulse commutated soft-switching current-fed converters ***2017 IEEE IAS International Graduate Thesis Award-1st place***	ORNAL, USA
	Dr. Suvendu Samanta (PhD) **Thesis Topic:** Analysis and design of current-fed wireless inductive power transfer systems ***2018 Governor General Gold Medal, 2019 Concordia University Distinguished Doctoral Dissertation Award, and 2019 ECE Doctor of Philosophy Convocation Award**	Postdoctoral RA, FREEDM, NCSU, Raleigh, USA (To join IIT Delhi as Assistant Professor)
	Dr. Kalpani Thantirige (PhD) **Thesis Topic:** Multi-level medium voltage drives system for marine applications	Power Grid, Singapore
	Dr. Satarupa Bal (PhD) **Thesis Topic:** Analysis and design of soft-switching current-fed topologies with new modulation techniques for DC microgrid and energy storage applications ***2019 IEEE IAS International Graduate Thesis Award-1st place***	CE+T Power Belgium
	Dr. Gnana S. Kulothungan (PhD) **Thesis Topic:** Low frequency modulation techniques for multilevel converters for solar PV Application ***2020 IEEE IAS International Graduate Thesis Award-2nd place***	POSTDOC@University of Houston, USA
	Dr. Sivanagaraju Gangavarapu (PhD) **Thesis Topic:** Analysis and design of discontinuous conduction mode ac-dc power factor correction converters *2017 IEEE Myron-Zucker Student-Faculty Research Award $25,000 USD*	Postdoc@NCSU, USA
	Venkata Ratnam V. (PhD) **Thesis Topic:** Analysis and design of soft-switching current-fed 3-element resonant converters	**RA@Concordia**
	Ahmed H Kotb (M.A.Sc.) **Thesis Topic:** Validation and enhancement of two-level inverter models for very low time-step real-time applications	**Murata, Canada**

	Mohd H Afshin (M.A. Sc.) **Thesis Topic**: Received side control for efficient inductive power transfer for vehicle recharging	**Sparq Systems, Canada**
	Avinash Sharma (M.A. Sc.) **Thesis Topic**: Dynamic programming based approach for Energy Trading	**Algolux, Canada**
	Deepak Chetia (M.A.Sc.) **Thesis Topic:** Validation and enhancement of a three-level inverter for applications in real-time simulations	**Vale, Calgary.**
	Manisha Verma (M.A.Sc.) **Thesis Topic:** Analysis, design, and control of a single-phase single-stage grid-connected transformerless solar inverter	**Ossiaco, Montreal**
	Koyelia Khatun (M.A.Sc.) **Thesis Topic:** Small signal analysis and control of snubberless naturally-clamped soft-switching current-fed PWM dc/dc converters	**PhD at ASU, USA**
	Aditya Bhatt (M.A.Sc.) **Thesis Topic:** A hybrid switching VSC based converter for reactive power compensation in utility grid	**jobseeker**
Under Supervision	**Swati Tandon (PhD)** **Thesis Topic:** Analysis and design of 2-element series LC partial-resonance-pulse based current-fed ZCS dc-dc converters	**Expected by April 2021**
	Ronake Nemade (MASc) **Thesis Topic:** Model predictive control of multilevel inverters	**Expected by April 2021**
	Abhinandan Dixit (M.A.Sc.) **Thesis Topic:** Two-stage isolated charger for e-Rickshaw	**GaN Systems, Ottawa**
	Karan Pande (M.A.Sc.) **Thesis Topic:** Non-isolated single-stage charger for e-Rickshaw	**Power Integration, Canada**
	K. Akhil Raj **Thesis Topic:** Optimal location allocation, EV charging scheduling and impact on the grid of large EV penetration	**Defense, Nov 2020**
	Sukanya Dutta **Thesis Topic:** DC/DC bidirectional converter for V2V	**Expected by June 2021**
	Avishek Roy **Thesis Topic:** High-efficient domestic overnight EV slow charger	**Expected by June 2021**
	Amir Hossein Mehdizadeh **Thesis Topic:** High-frequency Soft-switching Resonant Inverters	**Jobseeker**

	Candidate's name	Present Position
Postdoctoral Supervision	**Dr. Prasanna Rajagopal** **Topic:** Three-phase SRSPM and DTPM inverters	Texas Instruments, Dallas, USA
	Dr. Anirban Ghoshal **Topic:** Control of bidirectional six pulse modulated pulsating dc link inverter/rectifier	Assistant Professor, IIT Dhanbad, India
	Dr. Sivanand Kumar Nunna **Topic:** Energy management in Microgrid	Assistant Professor, Nazarbayev University, Astana, Kazakhstan
	Dr. Rajasekhar Reddy Chilpi **Topic:** Control of three-phase inverters for microgrid application	Assistant Professor, SVNIT Surat, India
Research Engineers Supervision	**Devendra Patil** **Topic:** Non-isolated high gain current-fed dc/dc converters	PhD at University of Texas at Dallas, USA
	Soumik Mandal **Topic:** Control of bidirectional six pulse modulated pulsating dc link inverter/rectifier	PhD at University of Cincinnati, USA
	Dorai Babu Yelaverthy **Topic:** Bidirectional DAB dc/dc converter	PhD at Utah State University, Logan, USA
	Suvendu Samanta **Topic:** Concept study and feasibility analysis of current-fed system for wireless power transfer	PhD at Concordia University, Canada
	Ravi Kiran Surapaneni **Topic:** Solar microinverter	PhD@NUS Singapore
	Kanakesh Vatta Kkuni **Topic:** Control of bidirectional six pulse modulated pulsating dc link inverter/rectifier	PhD Scholar at DTU, Denmark

Teaching Award	Faculty's teaching award (Certificate) National university of Singapore	AY 2012/13
Teaching Grant	Experimentation of Solar-to-Battery Charger Center for Development of Teaching and Learning, Singapore, $4050 **Developed experiment, procedure, and lab manual*	(100%) PI
New course development	(1) EE5703R Modeling and Control of Electrical Actuators (2) E5711R Modeling and Control of Power Electronic Converters (3) EE6531 Selected Topics in Smart Grid Technologies (4) EE4432 Devices for Electric Energy Generation *Developed syllabus, assessment, and teaching material of these courses.*	
New lab and lab manual development for UG 4th level	*The experimentation includes Solar Panel Characterization, Effect of Shading and Intensity, Maximum Power Point Tracking (MPPT), Solar-to-Battery Charging, and Battery Charging-Discharging Characteristics.*	

Other appointments:

1) Adjunct Professor: Indian Institute of Technology, Jodhpur, India, 2018
2) Adjunct Assistant Professor: Solar Energy Research Institute of Singapore (SERIS), 2011-15
3) Visiting Professor: University of Technology at Belfort-Montbeliard (UTBM), France
4) Visiting Professor: Northwestern Polytechnical University (NPU), Xian, China
5) Visiting Professor: National Institute of Technology, Warangal, India; July 2019

Consultant:

1) Robert Bosch South East Asia Pte. Ltd. (2015)
2) Sirius Controls, India (2018)
3) Insta-Sine (2018-till date)

Patent

Patent# EP2312739A1 and EP2312739B1

Year granted: 2013

Title: Optimal Pulse width modulation for multilevel inverter systems

Inventors: P J Torri, G. D. Cunha, T. Boller, A. K. Rathore, J. Holtz, and Nicholas Oikonomou
Owner/Company: WEG
Description:

Medium voltage AC drives based on voltage source inverters are in increasing demand for various industrial applications. To achieve better efficiency at higher power, the voltage rating rather than the current of the inverter is increased. Multi-level inverters are a preferred choice for medium voltage drive applications. They allow operation at multiple of dc link voltage and reduce the total harmonic distortion as compared with conventional two level inverters. It is desired, however, to operate medium voltage drives at switching frequencies below 1 kHz in order to minimize the switching losses. In the present document a method for obtaining very low switching frequency operation and low harmonic distortion using synchronous optimal modulation is described. This permits a significant reduction of the switching frequency without sacrificing on harmonic content.

The present document relates to multi-level inverter systems. In particular, it relates to the control of switching instants of the switching devices of such multi-level inverter systems. A method for determining a pulse pattern of a multi-level inverter system for a motor drive is described. The multi-level inverter system comprises a set of switching devices providing 'L' levels of output potentials and an output current. The pulse pattern comprises a set of 'N' switching instants, at which switching of the multi-level inverter system to an adjacent level of output potential occurs. The method comprises the steps of determining a set of possible pattern structures, and of setting a set of fundamental frequencies the output current waveform. For a possible pattern structure in the set of possible pattern structures and for each fundamental frequency from the set of fundamental frequencies, the method comprises the further step of determining the 'N' switching instants which provide a relative minimum value of an objective function which is associated with the total harmonic distortion of the waveform of the output current, thereby yielding a set of pulse patterns for the set of fundamental frequencies. Corresponding switching instants from the set of pulse patterns are continuous across the set of fundamental frequencies.