Indian Institute of Technology Roorkee

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Profile Summary

- Ph.D.(P) and M. Tech degree (***88.33%***) from EE department, ***IIT Roorkee*** offering 6+ years of Industrial R&D and Academic experience in various engineering domains
- Presently working as Director (Technical) in ***Zunik Energies Pvt. Ltd. (IIT Roorkee Incubated Startup)***, working on modelling and controls of advanced power electronics converters for Renewable Energy and EV/HEV Applications
- Previously worked as Visiting Researcher at ***FREEDM System Center, NC State University, USA***. Involved 200KVA SiC Inverter Performance Investigation Using FPGA and Development of Novel Characterization Circuit for Power Electronics Devices Testing.
- Prior to FREEDM System Center, worked as an ***Assistant Professor*** at Electrical Engineering Department in Graphic Era University, Dehradun.
- Guided several M. Tech students, mostly in Power Electronics and control, Renewable Energy and FPGA Controlled Converters Domain.
- Expertise in MATLAB/SIMULINK, Power Electronics Converters and Control, FPGA Controller.
- Completed major project on "Single Stage Solar Inverter" during Ph.D. (***Patent Published, which is backing the Startup***)
- Completed major project on "***200KW SiC Inverter Testing***" during work at FREEDM System Center, NC State University, USA.
- Worked in tools as Eagle software (for PCB design), Xilinx ISE for FPGA Controllers Spartsan-6 and 3E; familiar with TI-DSP processor - TMS320F240, TI- processor - TMS320F148, MSP-430.
- Possess strong communication, team management, negotiation, leadership, training, problem solving and motivational skills.

WORK EXPERIENCE

Zunik Energies Pvt. Ltd. as Director Technical **Oct'17-Present**

Highlights

1. Session Chair at 10th IEEE Conference Session (SCORed2017) in *Malaysia*.
2. Conducted 1-week FDP at MVGR College of Engineering, Vizianagaram on *Power Electronics for Renewable Energy & Electric Vehicle Applications*.
3. Nominated by IIT Roorkee *Festival of Innovation and Entrepreneurship (FINE-2018)*, Rashtrapati Bhavan
4. Invited for Guest Lecture on "*Trends of power electronics on renewable energy*" by Dev Bhoomi Group of Institutions, Dehradun.
5. Invited for ***Troubleshoot Inc.'*** organized by Student Alumni Interaction Cell (SAIC), Thapar University, Punjab to mentor their startups
6. Invited and Presented regarding our startup in ***TiE-Women Entrepreneurship Conclave*** held in IIT Roorkee organized by TIDES.
7. Have an MOU with ***MVGR Engineering College*** **(MVGR COE)**
8. Have an ***Incubation Agreement with TIDES, IIT Roorkee***.
9. Received ***IITRHF-2017 Judges Choice Award***.
10. Invited for Expert Lecture on "***Technological Innovation and Value Addition for Rural Development***" by NITTTR, Chandigarh.
11. Nominated by TIDES Business Incubator, IIT Roorkee for the exhibition at ***Destination Uttarakhand (UKIS-201)*** (Chief Guests are Prime Minister of India and CM of Uttarakhand)
12. Received ***1st prize in IKMC 2018 Startup Exhibition***.
13. Invited delegate for ***CII DST India – Italy Technology Summit*** held on 29th and 30th Oct, 2018 at Taj Palace, New Delhi (Chief Guest is Prime Minister of India and Prime Minister of Italy).
14. Invited delegate for ***FINTECH-2018*** held on 22nd to 26th Oct, 2018 at Novatel, Visakhapatnam (Chief Guest is Chief Minister of Andhra Pradesh).
15. Invited for Expert Lecture on "***Technological Innovation and Value Addition for Rural Development***" by NITTTR, Chandigarh.
16. Invited to showcase Innovation at *FICCI 14th Higher Education Summit*

17. Invited for Exhibition at *Gyan Kumbh* organized by Patanjali on 3-4 Nov,2018 (president of India is Chief Guest).
18. Organized 1-week **FDP** at Aditya College of Engineering, Kakinada on *Power Electronics for Renewable Energy Applications* from 12th to 17th Nov, 2018.
19. Selected for ***SLUSH 2018*** which is held on 03rd to 05th December 2018 in Helsinki, Finland. (Funded by AP Innovation Society and Invest India)

Major Projects Handled

1. Single Stage Converters for Solar PV Applications
2. High Gain Converters for Electrical Vehicles
3. FPGA Controlled Power Converters

Senior Research Fellow, IIT Roorkee **June'14-Present**

Highlights

- Worked on Single Stage Power Conversion Project

Major Projects Handled

- Simulation and Hardware Implementation of Power Electronics Converters for Solar PV Applications
- Simulation of Novel Characterization Circuit for Power Semiconductor Device Testing

Junior Research Fellow, IIT Roorkee **June'14-Present**

Highlights

- Worked on Capacitor Clamped Boost Inverter Project Funded by TIDES, IIT Roorkee

Major Projects Handled

- 200KVA SiC Inverter- Performance Investigation
- Novel Characterization Circuit for Power Semiconductor Device Testing

Visiting Researcher, NC State University **June'16-May' 18**

Highlights

- Worked on Power America and USCi Funded Project

Major Projects Handled

- 200KVA SiC Inverter- Performance Investigation
- Novel Characterization Circuit for Power Semiconductor Device Testing

Graphic Era University. as Assistant Professor **July,12 - July'14**

Highlights

- Took the Master's lab, entitled" Industrial Drives Lab"
- Faculty advisor/course coordinator, Advanced Control and Industrial Drives Centre
- Working on Developing Supervisory Controls for Hybrid Electric Vehicles

Major Projects Handled

- Multi-Level Converter and Control Using FPGA for Drives Applications
- Bi-Directional Power Converters for Solar PV Applications

Educational Qualification

1. Ph.D. (P) at Electrical Drives and Power Electronics Research Group in Electrical Engineering Department, IIT Roorkee.
2. Post-Graduation from IIT Roorkee with the specialization of Electrical Drives and Power Electronics with 88.33% in 2012.

Grants Received/Selected (18.98 Lakhs (Received) + Incubation Facilities (worth of 16 Lakhs)+ 57 Lakhs (Yet to Receive))

#	Fund/Scheme	Funding Agency	Received/Granted or Final Stage of selection(*) Amount
1.	Bhaskara Advanced Solar Energy Fellowship/Internship Programme	DST, India	10,40,000
2.	International Travel Grant	IIT Roorkee	25,000
3.	Prototyping Grant	TIDES,IIT Roorkee	80,000
4.	Startup Incubation	TIDES, IIT Roorkee	*Incubation Facilities (worth of 24 Lakhs)
5.	Startup Seed Grant	TIDES, IIT Roorkee	25,00,000*
6.	Startup	Investor	8 Lakhs*
7.	Faculty Development Program	MVGR COE	2 Lakhs
8.	Guest Lecture for one Session	DBIT, Dehradun	10,000
9.	Festival of Innovation and Entrepreneurship (FINE-2018) Travel Grant	IIT Roorkee	5,000
10.	IITRHF Business Plan Competition	TIDES, IIT Roorkee	30,000
11.	INC Most Promising Innovation Award	IKP	50,000 + 8,000
12.	Faculty Development Program	Aditya College of Engineering, Kakinada	2 Lakhs

13.	Slush, Helsinki	DIPP (Department of Industrial Policy and Promotion) and APIS	40000+1,20,000+40,000
14.	IEEE Journal Additional Pages	IITR	50,000*

Awards/ Honoured Positions

1. Selected for 2017 Albert Nelson Marquis Lifetime Achievement Award by Marquis Who's Who.
2. Name listed in Who's Who in the World 2018 by Marquis (USA)
3. Name listed in Who's Who in the World 2016 by Marquis (USA)
4. Session Chair at 2017 IEEE SCOReD International Conference during 13th-14th Dec 2017 at Everly Hotel, Putrajaya, Malaysia.
5. Invited for 36 sessions out of 36 sessions in a Faculty Development programme at Aditya College of Engineering, Andhra Pradesh (to be held on Nov12 to 17th, 2018).
6. Guest Lecture on "Trends of Power Electronics on Renewable Energy System" at Dev Bhoomi Group of Institutes, Dehradun.
7. Delivered 18 sessions out of 24 sessions in a Faculty Development programme at MVGR College of Engineering, Andhra Pradesh.
8. Delivered 18 sessions out of 24 sessions in a Faculty Development programme at Aditya Engineering College, Andhra Pradesh.
9. Invited for SAIC, Thapar University to mentor their Start-ups
10. Selected for cLINK Scholarship to pursue Ph.D. from University of Northumbria, UK.
11. Nominated by Ministry of Human Resource Development, India for Government Scholarship to pursue Ph.D. from any Japan University.
12. Received MHRD scholarship during the M.Tech, 2010-12.
13. Currently receiving MHRD scholarship during PhD from July 2014

Reviewer for Journals

14. IEEE Transactions on Industrial Electronics (Impact factor of 6.498)
15. IEEE Transactions on Journal of Emerging and Selected Topics in Power Electronics (Impact factor of 5.177)
16. International Journal of Electrical Power and Energy Systems, Elsevier (Impact factor of 3.432)
17. Journal of Solar Energy, Elsevier (Impact factor of 3.469)
18. Power Electronics, IET (Impact factor of 1.6)
19. Generation, Transmission & Distribution, IET (Impact factor of 1.353)
20. International Transactions on Electrical Energy Systems (Impact factor of 1.085)
21. Renewable Power Generation, IET (Impact factor of 1.60)
22. Electric Power Components and Systems Journal, Taylor and Francis (Impact factor of 0.69)
23. Reviewer for *IETE Journal of Research* (Impact factor of 0.6)
24. Reviewer for IEEE Access
25. Reviewer for Mathematics and Computers in Simulation (Elsevier)

Invited Talks

26. *Speaker Invitation* for INAIT Conference-2019, University of Cambridge, United Kingdom.
27. *Speech Invitation* from 7th Annual World Congress of Advanced Materials (W.C.A.M) 2018, in Xiamen, China with theme of "Innovation, Integration, Transformation and Sustainability"
28. Got an Opportunity to present an *Invited paper* at MIC-Electrical 2014 (1st International Conference on Electrical Engineering and Application), to be held in Athens, Greece: 4-6 April 2014.
29. Got an *invitation to deliver a speech* at 1st International Symposium on Energy Challenges and Mechanics, Aberdeen, Scotland, UK, 8-10 July 2014.
30. Got an *invitation to contribute a talk* in a Session 02: Renewable energy at 3rd International Symposium on Energy Challenges and Mechanics (ECM3) - towards a big picture, 7-9 July 2015, Aberdeen, Scotland, UK
31. *Speech Invitation* from the World Congress of Smart Energy-2017, Wuxi, China for **Session 301: Solar PV Technologies**
32. *Speaker Invitation* for 6th Annual World Congress of Advanced Materials-2017 (WCAM-2017, Xi'an) at Track702: Photovoltaics, Solar Energy, Artificial Photosynthesis Materials and Devices

Lead Guest Editor

33. Got an Invitation from *SciencePG* to propose a Special Issue in my research field and offered Lead Guest Editor, Science Publishing Group, NEW YORK, U.S.A.

Professional memberships

34. Full Member (MEEC) of the *European Energy Centre*

Technical Program Committee for Journals

35. Technical Program committee member for *International Journal of Computing and Digital Systems (IJCDS)*.

Technical Program committee for Government Summits

36. *Technical Program committee* for International Biometrics & Smart Government Summit (IBMSGS' 2014), 22-24 March 2014, Dubai, UAE.

Technical Program Committee for Conferences held in abroad

37. *Technical Program committee* for IEEE International Conferences on Composite materials and Renewable Energy Applications (ICCMERA'2015), Sousse, Tunisia, 22-24 January 2015.
38. *Technical Program Committee* for International Conference on Solar Energy and Building (ICSoEB' 2015).
39. *Program Committee* for 2014 IEEE International Conference on Intelligent Energy and Power Systems, June 2-6, 2014, Kyiv, Ukraine.

40. *Technical Program Committee* for IEEE International Conferences on Composite materials and Renewable Energy Applications (ICCMERA'2014), Sousse, Tunisia, 22-24 January 2014
41. *Technical Program Committee* for International Conference on Computer Vision and Image Analysis applications (ICCVIA' 2014), 25-27 March 2014, Ras Al Khaimah, UAE
42. *Technical Program Committee* for 2014 IEEE Conference on Energy Conversion (CENCON 2014), 13–15 October 2014, Johor Bahru, Malaysia
43. *Technical Program Committee* member for IEEE International Conference on Energy Conversion (CENCON 2015), Johor Bahru Malaysia, 19-21 October 2015.
44. *Technical Program Committee* member for 2017 IEEE SCOReD to be held during 13th Dec 2017 to 14th Dec 2017 at Everly Hotel, Putrajaya, Malaysia
45. *Technical Program Committee* member for CENCON 2017-(2017 IEEE Conference on Energy Conversion (CENCON)) Kuala Lumpur, Malaysia on 30–31 October 2017
46. *Member* for SIRS-2017 (Third International Symposium on Signal Processing and Intelligent Recognition Systems (SIRS'17))
47. *Member* for IEEE TENSYMP 2017 (2017 IEEE Region 10 Symposium (TENSYMP))

Reviewer for IEEE Conferences held in abroad

48. *Reviewer* for IEEE International Conference on Research & Development (SCOReD), 16-17 December 2013, Putrajaya, Malaysia.
49. *Reviewer* for IEEE International Conference Reviewer for IEEE International Conference on Composite materials and Renewable Energy Applications ICCMERA'2014, 22-24 January 2014, Sousse, Tunisia.
50. *Reviewer* for 2014 IEEE 8th International Conference on International Power Engineering and Optimization (PEOCO2014), 24-25 March 2014, Langkawi, Malaysia.
51. *Reviewer* for 23rd IEEE International Symposium on Industrial Electronics (ISIE 2014), June 1-4, 2014, Istanbul, Turkey.
52. *Reviewer* for 3rd International Conference on Frontiers in Intelligent Computing, Theory and Application (FICTA-2014), Orissa, India, 14-15 November 2014.
53. *Reviewer* for Annual Convention and International Conference on Emerging ICT for bridging future (CSI-2014), 12 Dec 2014.
54. *Reviewer* for Second International Conference on Information systems Design and Intelligent Applications - 2015 (INDIA-2015) Kalyani, India, January 8-9, 2015
55. *Reviewer* for Renewable Energy and Green Technology International Conference 2015 (REEGETECH'2015), Bali, Indonesia, 2 – 4 June 2015.
56. *Reviewer* for 2015 Advanced Research In Material Sciences, Manufacturing, Mechanical and Mechatronic Engineering Technology International Conference (AR4MET2015), Bali, Indonesia, 2-4 June 2015
57. *Reviewer* for 2017 IEEE SCOReD to be held during 13th Dec 2017 to 14th Dec 2017 at Everly Hotel, Putrajaya, Malaysia
58. *Reviewer* for CENCON 2017-(2017 IEEE Conference on Energy Conversion (CENCON)) Kuala Lumpur, Malaysia on 30–31 October 2017
59. *Reviewer* for [ARiEET'2017] 2017 2nd Advanced Research in Electrical and Electronic Engineering Technology (ARiEET)
60. *Reviewer* for [RESEECS'2017] 2017 Recent Development in Sciences, Engineering, and Computer Sciences International Conference
61. *Reviewer* for [I4CT'2018] 2018 4th International Conference on Computer, Communication and Control Technology
62. *Reviewer* for [SISTECH'2018] 2018 Symposium on Islamic Sciences and Technology
63. *Reviewer* for [AVAREIT'2018] 2018 2nd Advanced Research in Electronic Engineering and Information Technology International Conference
64. *Reviewer* for 2018 International Conference on Advances in Computing, Communications, and Informatics (ICACCI)
65. *Reviewer* for ICCMREA 2017 (2017 International Conference on Composite Materials & Renewable Energy Applications)

Patents

1. *US Patent*: Douglas C Hopkins, Dogga Raveendhra, "Energy Re-Circulation Circuit and Controls for Applications including Power Semiconductor Device Characterisation", Filed at Office of Technology Commercialisation and New Ventures, NCSU for US patent. Ref. No: 17126
2. *US Patent*: Douglas C Hopkins, Dogga Raveendhra, Subhasis Bhattacharya "Novel Single-Stage Converter and Control Scheme", Filed at NCSU Office of Technology Transfer for US patent. Ref. No: 17125
3. *Indian Patent*: Raveendhra, Dogga. Kumar Shashank Sekhar. 2013, "Effective Utilisation of Sea Water by Employing Different Modes of Renewable Energy Power Generation Methods in the Process of Desalinisation", India,22nd March 2013(Filed) (Patent Application Number:861/del/2013)
4. *Indian Patent*: Raveendhra Dogga, M K Pathak, "Novel Single-Stage Inverter", Application Number: 201641038706
5. *Indian Patent*: Ravi Kumar KS, Raveendhra Dogga, Nagesh Kumar, V V Sastry Vedula, Novel Capacitor Clamped Bidirectional DC-DC Converter, Application Number: 201641038706

Books/ Book Series/ Lecture Notes

6. DBLP Lecture Notes in Computer Science Engineering: Raveendhra, Dogga, "Simulation-based study of FPGA based controller for Single-Phase Matrix Converter for different types of loads", IDES CPS in LSCS Series. (*Indexing: Thomson ISI Proceedings, DBLP, IET Inspec, Scopus, EI Compdex, Google Scholar, Proquest, etc.*)
7. Springer Lecture Notes in Electrical Engineering: Raveendhra, Dogga, Padmanabh Thakur, Abhisekh Chauhan., "FPGA Controlled Power Conditioning System for Solar PV Fed PMDC Motor", LNEE Springer. ISSN: 1876-1100. (*Indexing: ISI Proceedings, EI-Compendex, SCOPUS, EI Compendex, MetaPress, Springerlink*)
8. Springer Lecture Notes in Electrical Engineering: Abhisekh Chauhan, Padmanabh Thakur, Raveendhra, Dogga., "Quantification and Assessment of Voltage Unbalance Condition", LNEE Springer. ISSN: 1876-1100. (*Indexing: ISI Proceedings, EI-Compendex, SCOPUS, EI Compendex, MetaPress, Springerlink*)

Journal Publications

9. Dogga Raveendhra, MK Pathak, "3-Phase Capacitor Clamped Boost Inverter", IEEE Journal of Emerging and Selected Topics in Power Electronics (Impact Factor: 5.177)
10. Narasimharaju.B.L, Ramanjaneya Reddy U, Raveendra Dogga, Design and Analysis of Voltage Clamped Bidirectional DC-DC Converter for Energy Storage Applications, IET Journal of Engineering, Open Access

IEEE Publications

11. Raveendhra, Dogga.; Pathak, M. K.; Panda, Aurobinda; , "Power conditioning system for solar power applications: Closed loop DC-DC convertor fed FPGA controlled diode-clamped multilevel inverter," Electrical, Electronics and Computer Science (SCEECS), 2012 IEEE Students' Conference on, vol., no., pp.1-4, 1-2 March 2012, India, doi: 10.1109/SCEECS.2012.6184820 (Indexed in SCOPUS)

12. Raveendhra, Dogga.; K.P.G Swamy; Padmanabh Thakur, "FPGA based 2-stage power conditioning system for PV power generation," IEEE International Conference on Power, Energy, and Control, 6-8 February 2013, India. DOI: 10.1109/ICPEC.2013.6527622 (EI indexed and Indexed in SCOPUS)

13. Samual; Dr. Deepak Joshi; Dr. R.S. Prasad; Raveendhra, Dogga. , " The practicability of ICA in home appliances load profile separation using current signature: a preliminary study," IEEE International Conference on Power, Energy and Control, 6-8 February 2013, India. DOI: 10.1109/ICPEC.2013.6527756 (EI indexed and Indexed in SCOPUS)

14. Raveendhra, Dogga.; Babloo Kumar, Devesh Mishra, Meenakshi Mankotia, "Design of FPGA based Open Circuit Voltage MPPT Charge Controller for Solar PV System," IEEE International Conference on Circuit, Power and Computing Technologies, 2013 21st&22nd March, India. DOI: 10.1109/ICCPCT.2013.6529012 (Indexed in SCOPUS)

15. Dogga. Raveendhra, B.L.Narasimha Raju, Padmanabh Thakur, "Design and Small signal analysis of solar PV Power Conditioning system fed FPGA Controlled Bi-Directional DC-DC Converter "IEEE International Conference on Circuit, Power and Computing Technologies, 2013 21st&22nd March, India. DOI: 10.1109/ICCPCT.2013.6529011 (Indexed in SCOPUS)

16. Tripti Saini, Raveendhra, Dogga. Padmanabh Thakur, "Stability Analysis and Design of FPGA Based Perturb and Observe Method MPPT Charge Controller for Solar PV System," 2nd IEEE Students Conference on Engineering and Systems (SCES), April 12-14,2013, INDIA. doi: 10.1109/SCES.2013.6547545 (Indexed in SCOPUS)

17. Abhisekh Chauhan, Padmanabh Thakur, Raveendhra, Dogga. "Voltage sag Characterisation and detection," 2nd IEEE Students Conference on Engineering and Systems (SCES), April 12-14,2013, INDIA. doi: 10.1109/SCES.2013.6547498 (Indexed in SCOPUS)

18. Raveendhra, D.; Prakash, P.; Saini, P., "Simulation-based analysis of FPGA controlled Cascaded H-Bridge Multilevel inverter fed solar PV system," Energy Efficient Technologies for Sustainability (ICEETS), 2013 International Conference on, vol., no., pp.568,572, 10-12 April 2013 (Indexed in SCOPUS)

19. Raveendhra, Dogga.; Chandrika Venkata Avinash, Sunil Samual, "Small Signal Analysis and Design of FPGA based Fractional Open Circuit Voltage MPPT Charge Controller for Solar PV System," IEEE International Conference on Circuit, Power and Computing Technologies, 2013 21st&22nd March, India. (Indexed in SCOPUS)

20. Shailendra Singh, Munendra Singh, Saurabh Chanana and Dogga Raveendhra, "Operation and Control of a Hybrid Wind- Diesel-Battery Energy System Connected to Micro-Grid,"IEEE Sponsored International Conference on Control, Automation, Robotics and Embedded System 2013 Dec16-18.

21. Dogga. Raveendhra, Praval Joshi, and Rohit Kumar Verma, "Performance and control system design for CVMPPT boost Converter for FPGA controlled SPV water pumping System for Remote applications", 2014 Power and Energy Systems Conference: Towards Sustainable Energy (PESTSE), 13 Mar - 15 Mar 2014.

22. Dogga. Raveendhra, Saad Faruqui and Parvesh Saini "Transformerless FPGA Controlled 2-Stage PV System", 2014 Power and Energy Systems Conference: Towards Sustainable Energy (PESTSE), 13 Mar - 15 Mar 2014.

23. Dogga Raveendhra, Rahul Kumar, and Shailendra Singh, "Performance investigation of FPGA controlled central three-Level diode clamped inverter in two-stage SPV system", Second international conference on Electrical Energy System(ICEES), 7th- 9th January 2014.

24. Dogga. Raveendhra, Peerzada Ridwan ul Zaman, and Kumar Govind, "FPGA controlled high gain Bi-Directional DC-DC Converter (BDC) for energy storage of solar power", Second International Conference on Electrical Energy Systems (ICEES -2014), 7-9 January 2014.

25. Dogga Raveendhra, Harshit Mohan, M K Pathak & Poojitha Rajana, "Model Reference Adaptive Controller based Stand Alone Solar PV Pumping System" IEEE International Conference on Research & Development (SCOReD), 13-14 December 2017, Putrajaya, Malaysia.

26. Dogga Raveendhra, M K Pathak, "Modular Multi-Level Inverter with self-healing power unbalancing capability in Single Stage Solar PV Systems" IEEE International Conference on Research & Development (SCOReD), 13-14 December 2017, Putrajaya, Malaysia.

National Conferences

27. Won a certificate of merit for presenting a paper entitled "Embedded based 1-phase to 3- phase Conversion" at Aadhrita'08 a National level Student meet held at M.V.G.R. College of Engineering College in 2008.

Projects Guided

M.Tech Projects

1. Development of Cascaded H-Bridge MLI for solar PV systems
2. Development of Bi-Directional DC-DC Converter for Solar Applications
3. Development of MPPT charge controller for photovoltaic solar PV system
4. Performance and Control System Design for FPGA based CVMPPT Boost Converter for Remote SPV Water Pumping System Applications
5. FPGA Controlled High Gain Bi-Directional DC-DC Converter (BDC) for Energy Storage of Solar Power
6. Performance Investigation of FPGA Controlled Central Three-Level Diode Clamped Inverter in Two-Stage Solar Photo Voltaic (SPV) System
7. Transformer Less FPGA Controlled 2-Stage Isolated Grid Connected PV System
8. Common Mode Voltage Reduction Techniques in Induction Motor Drive

B.Tech Projects

9. Guided 25 students for their academic B.Tech Project work.

Research Areas of Interest

1. Wide Band-Gap Devices
2. Renewable Energy Sources
3. Advanced Power Electronics
4. Switched Mode Power Supplies
5. FPGA, DSP Controllers for PE Applications
6. IoT based Smart Power Converters for EVs

TECHNICAL QUALIFICATIONS

Languages	C, MATLAB, VHDL
Software Packages	Xilinx System Generator, Altium, Eagle, MULTISIM, MATLAB, LabVIEW, PSIM, dSPACE Control desk, MS Office, Arduino IDE and CCStudio

Operating systems	Windows, Ubuntu
Hardware Controllers Used	FPGA Controller (Spartan-3E and Spartan-3A), DSP Controller (TMS320F2812), dSPACE, Analog Controllers, Arduino MCUs (Arduino Due, Arduino Mega, Arduino Uno) and TI Piccolo lunch Pad
Hardware's designed	Capacitor Clamped Boost Inverter, Multi-Level Inverter, DC-DC Converter

Projects

1. Performance Investigation of 200KW Sic Inverter: (FREEDM Systems Centre, NC State University)

2. Novel Single Stage Boost Inverter: (FREEDM Systems Centre, NC State University)

This Project introduces a novel type of 3-phase single stage dc-ac converter, which is controlled by sliding mode control, offers an intrinsic step up abilities. Proposed inverter is designed with the lesser number of solid-state semiconductor switches and small passive elements. Sliding mode controller (robust controller) is designed to control this power converter in order to achieve high robustness, sustain any kind of line or load variations and achieve a good dynamic response. In addition to this, the voltage across every capacitor is less when compared with existed traditional boost inverter topologies, which leads to better reliability and enhanced lifespan of the converter. This scheme also offers very less harmonic in the output voltage and currents. The proposed scheme is tested for a different line and load varying conditions on MATLAB Simulink environments as well as on a prototype. A 500W prototype has been fabricated and experimented to validate the feasibility and benefits of the system. Simulation and Experimental results reveal that proposed inverter offers better reliability, power quality and high lifetime over the existed topologies.

3. Novel Testing Circuit for Power Electronic Device Characterization: (FREEDM Systems Centre, NC State University)

A novel energy recirculation circuit utilizes the concept of energy recirculation, with the power augmentation capability, is proposed. Proposed ERSC can be used as device in-situ testing unit, by utilizing naturally occurring high electrical stresses on devices from a low-cost low-power source to supply energy for high power testing of power electronic devices. This topology allows devices to be examined at full-power stresses without connected with high power load and also without demanding high power, by storing and recirculating the energy of the energy storage elements, which elevates the capability of source power. This converter can operate in four different modes of operation, namely, soft-start, magnetize, charge and energy recirculation modes with the four active states of operations attained by two active switches of the proposed converter. Another feature of this converter is, based on the devices under test devices performance these two circuits can be designed to operate in synchronous or asynchronous manner, i.e. faster devices or slower devices can be tested.

For an in-situ testing of high current and/or voltage devices, this circuit offers several advantages such as simple circuit design, does not demanding any high voltage step-up transformer for realizing high voltages/currents, can be able to operate from low voltage/ power supply, cheapest solution and also provides fast response in comparison with conventional cascaded boost/buck and cascaded buck/boost ERSCs. To validate the concept, simulations are carried for testing of 1.2KV and 100A using 100V and 8A. And also, the same is going to prove with the help of lab-made prototype.

4. Development of Efficient Single Stage Power Converter System for Solar PV applications

1. Design and modelling of single phase and three phase capacitor clamped boost dc-ac inverters, which can develop a power conditioning system without demanding series connected PV modules due to its intrinsic boost capability.
2. To address the issue related to safety requirements in solar PV system without demanding more power electronic switches to provide dual grounding concept, a high gain power conditioning system can be developed.
3. Efficiency is increased and overall costs are lowered by achieving MV grid integration with only one step-up transformer, the inverter includes an MV-level transformer with a high turns ratio. Large-scale PV system architectures with reduced transformer stages can be realized by using high-gain and high quality power conditioning systems [26]. To meet this objective three phase high gain and high quality power conditioning system has been proposed.
4. To develop a solution for power decoupling issue and to increase the conversion efficiency by reducing the ripples at input side, a waveform control method can be adopted in proposed converter. In this method, the low-frequency power pulsation caused by ac output is absorbed by the capacitors while the input source (solar) kept a constant supply of dc power to the capacitors, thereby eliminating the effect of low-frequency ripple from affecting the properties of source (solar). Since capacitor voltages can be large without affecting the desired ac output voltage, capacitors of the inverter can be minimized. This allows the use of film capacitors over electrolytic capacitors, thereby improving the inverter's lifetime.
5. Modelling of proposed converter along with sliding mode controller for dynamic control, Reference tracking, Disturbance rejection and Wide range of control. To achieve high performance feedback control for the system, an accurate and well defined model is required. The small signal model of the proposed converter will be developed so that sliding mode controller design can be done by using non-linear control theory. Since SMC is normally used to control boost inverter and boost inverter also suffers from above mention problems. Solving this issue will have significant positive impact on sliding mode controller based boost inverters or buck boost inverters. To address this problem Fixed frequency sliding mode controller is proposed.
6. System development and Experimentation: Prototype hardware will be developed for proposed converter using digital controller platform (FPGA/dSPACE kit) for control of power devices. Some of the simulations results of the proposed converter system will be validated through this hardware set up.

5. Improved Power Quality Transformerless Power Converters for Solar PV applications

6. Development of Converter System for Solar PV Power Generation: (IITR)

Renewable energy resources will be an increasingly important part of power generation in the new millennium. The main objective of this project is to develop a power conditioning system, which can be used to extract the variable DC power from the sun. It is converted into fixed dc by using DC-DC boost converter and then converted into AC power by using 3- level diode clamped inverter, to feed AC load effectively. In this project simulation results of FPGA Controlled Photovoltaic (PV) power conditioning system for AC, loads are presented. The power conditioning system consists of a diode clamped three level inverter fed by a closed-loop voltage controlled DC-DC Boost converter. This closed-loop control of DC-DC converter is implemented by a conventional Pulse Width Modulator (PWM) with duty cycle ratio control method. This boost converter is designed to obtain regulated voltage from the variable DC supply. A level shift sinusoidal PWM is used to control the multilevel inverter on FPGA.

7. FPGA CONTROLLED DIODE CLAMPED 3-LEVEL INVERTER

In this project, the hardware of Diode clamped 3-level inverter is implemented and is controlled by FPGA Controller. This 3-level inverter is mainly developed for medium level power applications. FPGA has been preferred over a traditional microcontroller because an FPGA can work at frequencies of the order of 50MHz, while the latter can work with frequencies up to 5-6 MHz only, making the FPGA faster and more accurate in the generation of firing pulses.

8. Simulation of SPMC based Cycloconverter (6months)

The backbone of modern industry is electrical drives. Tremendous changes in speed control of electrical machines have been taken place with the development of power electronics. Nowadays, AC motors are also used for variable speed applications. At present in speed control of AC machines, single phase Cycloconverters are widely used for AC#AC power conversion. In this project, Single Phase Matrix Converter (SPMC) Topology using IGBT#s as power switches is used for Cycloconverters operation in place of the conventional thyristor as it offers a number of advantages. In this project, well known Sinusoidal Pulse Width Modulation (SPWM) scheme is

used for generating gate pulses to IGBT#s. This project presents work on modeling and simulation of Cycloconverters using MATLAB/Simulink incorporating the Sim Power System Block set.

Industrial Training

1. Attended an Industrial Training for 1 month on 'Protection and Detection of 3-Phase Transformers faults and its diagnosis' at WICORE PVT Industries Ltd. in Dec, 2008.

Workshops & Seminars

1. Participated in Workshop on Advanced control and computing technologies for reliable Industrial Electricity saving (acctries-2014) from 17-18 Feb. 2014 Organized by Department of Water Resources Development and Management & Indian Water Resources Society (IWRS) at Department of Water Resources Development and Management, IIT Roorkee.
2. Attended an AICTE recognized ICT based programme 5 days' workshop, "The FDP on soft computing", NITTTR, Chandigarh, 11- 15 November 2013.
3. Attended a National Workshop on MATLAB and its Applications" conducted at GMR Institute of Technology in Dec 2008.
4. Organised an IEEE associated workshop 'CIRCUIT SAPIENS' on MATLAB and PCB Design for Engineers at Graphic Era University in Mar 2013.
5. Delivered a Seminar at IEEE International Conference at MNNIT, Bhopal
6. Delivered a Seminar at IEEE International Conference at PSNA College of Engg.
7. Delivered a Seminar at IEEE International Conference at PSNA College of Engg.
8. Delivered a Seminar at IEEE International Conference at Nagapatnam.
9. Delivered a Seminar at National Conference at MVGR, Vizianagaram.
10. Curriculum seminars at IIT Roorkee.

Curricular Activities

1. Won a certificate of merit for presenting a paper entitled "Embedded based 1-phase to 3- phase Conversion" at Aadhrita'08 a National level Student meet held at M.V.G.R. College of Engineering College in 2008.

2. Attended a National Level Workshop on MATLAB and its Applications" conducted at GMR Institute of Technology in Dec 2008.

3. Secured a certificate of merit in the State wide Talent Test conducted by VIKAS PRATIBHA AWARDS SOCIETY, 2002-03.

4. Secured Mandal (Srungavarapu Kota) 1st rank in the first year and 2nd Rank in the second year of Intermediate.

Extra-Curricular

1. 7^{TH} UTTARAKHAND STATE SCIENCE & TECHNOLOGY CONGRESS (2012)
   Got a certificate of appreciation for active participation in the technical committee.
2. EENADU CHESS COMPETITION (2007)
   Got 4th Place in District Level CHESS Competition Conducted by EENADU in 2007.
3. India Red Cross Society
   Active Blood Donor.
4. TARANGINI TELUGU CULTURAL MEET AT IITR (2012)
   Winner in Volley Ball Competition
5. GRAFEST'13
   Winner in Chess Competition

Personal Details

Father's name	**Venkata Rao**
Date of birth	**18th April 1988**
Gender	**Male**
Marital Status	**Married**
Nationality	**Indian**
Linguistic Proficiency	**Telugu, English, Hindi**

References

Dr. M.K.Pathak	**Prof. S.P.Srivatsava**
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01332-285597	**01332-285069**

Declaration

I hereby state that all the information provided above by me is correct to the best of my knowledge.

Date **31-3-2018**

Place **Roorkee** **Dogga Raveendhra**