Gopalakrishna Srungavarapu

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EDUCATION

- Ph.D in Power System Instrumentation, IIT Madras, 2005 – 2011, CGPA: 8.75
- M. Tech in Power Systems, NIT Jamshedpur, 2002-2002, CGPA: 9
- B.Tech in Electrical and Electronics, JNTUEC, 1994-1998, Marks: 66 %

EXPERIENCE

- Associate Professor from 29th March 2023 till date, at NIT Rourkela
- Assistant Professor Grade-I from 02nd February 2018 to 28th March 2023, at NIT Rourkela
- Assistant Professor Garde-II (7th CPC) from 01st January 2016 to 01st February 2018, at NIT Rourkela
- Assistant Professor (6th CPC) from 04th August 2011 to 31 December 2015, at NIT Rourkela
- Lecturer (Contract) from 20th January 2011 to 31st July 2011, at RGUKT Nuzvid
- Project officer (Contract) from 05th Nov. 2010 to 05th Dec. 2010, IC&SR, IIT Madras

RESEARCH INTEREST

- Power quality improvement using Direct Power Control for 3-phase active front-end rectifiers
- Coreless sensing of current using magnetic sensors
- Detection of winding deformation power transformers
- Regenerative braking in Electric Vehicles

TEACHING ASSIGNMENTS

- Machine Analysis for M.Tech (Power Electronics and Drives)
- Power Quality in Power Distribution Systems for M.Tech (Power Systems)
- Instrumentation and Sensors for M.Tech (Industrial Electronics)
- Measurements and Instrumentation (Theory and Lab) for B.Tech (Electrical Engineering)
- Electrical Machines-II (Theory and Lab) for B.Tech (Electrical Engineering)
- Electrical Machine Design Lab for B.Tech (Electrical Engineering)

RESEARCH SCHOLARS

Ph.D Students

Sl. No.	Name of the Scholar	Thesis Title or Area of Research	Supervisors	Status
1	Amit Kumar	Development and Power Quality Investigations of Various Direct Power Control Techniques for 3-phase Active Front End Rectifier	Gopalakrishna Srungavarapu	Graduated (2018)
2	Noby George	Novel Coreless Current Sensing System: Design, Development, and Evaluation	Gopalakrishna Srungavarapu	Graduated (2019)
3	Abinash rath	Low Complexity Direct Power Control Methods for Active Front-End Rectifiers and Applications	Gopalakrishna Srungavarapu and Monalisa Pattnaik	Graduated (2023)
4	Mahendra Chandra Joshi	Control & Energy management of Battery/Ultracapacitor based Hybrid Energy Storage System	Susovan Samanta and Gopalakrishna Srungavarapu	Graduated (2019)
5	Mallela Veeranjaneyulu	Coreless sensing of current using magnetic sensors	Gopalakrishna Srungavarapu	Continuing
6	Mendi Balaji	Development of Efficient MPPT Techniques for a Small-Scale Standalone PMSG based Wind Energy Conversion System with Energy Storage Integration	Monalisa Pattnaik and Gopalakrishna Srungavarapu	Given the Synopsis Seminar and writing Thesis

M.Tech by Research Students

Sl. No.	Name of the Scholar	Thesis Title or Area of Research	Supervisors	Status
1	Amrit Anand Mahapatra	Improved Braking performance of an Electric Vehicle by Integrating Plug Braking with Regenerative Braking	Gopalakrishna Srungavarapu	Graduated (2014)

M.TECH PROJECT GUIDANCE

Sl. No.	Title	Student's Name	Year of Award
1	Design of Passive High Pass Filter for Hybrid Active Power Filter Applications	Gouri Shankar Mishra	2013
2	Application of Neural Network For Transformer Protection	Santosh Kumar Nanda	2013
3	Detection of winding deformation in power transformers	Saroja Kanti Sahoo	2013

4	Virtual Instrument based Maximum Power Point Tracking of a Solar Panel	Bijayini Behera	2014
5	Reliable Voltage Monitoring System for Synchronization of Distributed Power Generation Systems to Utility Grid	Saroj Kumar Panda	2014
6	Fuzzy Logic based Soft Starting of Induction Motor with Current Control	Suvra Gupta	2014
7	Classification of Faults in a Power Transformer using Fuzzy Logic and Wavelet Transforms	Shubham Sharma	2014
8	Design and Implementation of the Firing Circuit of a SPWM Inverter using Microcontroller	Sandeep Behera	2015
9	Selective Harmonic Elimination of the Multilevel Inverter using ANN	Chamarthi Sivaramaraju	2015
10	Real-Time Simulation of Three Phase Induction Motor Using Raspberry Pi	Surapu Jagan	2015
11	Analysis of Magnetic Field and Electromagnetic Forces in Transformer and Superconducting Magnets	Ashish Kumar Patel	2015
12	Performance Analysis of DSOGI PLL under Balanced and Unbalanced Conditions	Artham Divya	2015
13	Simulation and Analysis of Photovoltaic System using Virtual Instrumentation	Kantamani Krishna Tejaswini	2015
14	Design of Low Cost Single Phase Induction Motor based E-Scooter	Arpit Mishra	2016
15	Assessment of Winding Deformation in Power Transformer using SFRA and Numerical Techniques	Ashwini Bhujangrao Gaikwad	2016
16	Design and Optimization of Nonsolenoid Magnets with Resistive or Super-Conducting Coils	Gangavarapu Vaishnav	2016
17	Maximum Power Point Tracking Control Algorithm for Wind Energy Conversion Systems	Manoj Oram	2017
18	Grid Synchronization of Photo Voltaic System	Sukrashis Sarkar	2017
19	Direct Power Control of Three Phase PWM Rectifier using SVM	Bandi Myna	2017
20	Design and Development of Contact-Less Voltage Sensor	Munaganuri V Ravindranadh Gupta	2017
21	Modelling of Pmsg Based Stand-Alone WECS for Domestic Applications	K Sivakrishna	2017
22	Design, Development and Control of Rotary Electromagnetic Actuator using Finite Element Method	Shubhangi Jha	2018
23	Design And Analysis of Annular Linear Induction Pump (ALIP) and Linear Induction Motor (LIM)	Somasekhar Reddy	2018
24	Improved Stand – Alone Solar Battery Charger with MPPT and TSC Algorithms for Quick Charging with Excess Power Extraction	Soham Dineshbhai Delvadia	2018
25	A Simple Direct Power Control of Three-Phase PWM Rectifier using Virtual Flux Estimation	Kilaparthi Praveenkumar	2018
26	Grid Synchronization of a PV Array using Damped SOGI Control Algorithm	Sadhu Reddysekhar Reddy	2018
27	Design and Analysis of Different Digitizer Circuits for Non-Intrusive AC Voltage Measurement	Jyotsna Singh Kharwar	2018
28	Load Compensation Techniques using Instantaneous Symmetrical Component Theory	Dharmendra Kumar	2019

29	Power Quality Improvement using Predictive Direct Power Control	Shiba Prasad Majhi	2019
30	An Optimization-Based Control Strategy for Shunt Active Power Filter under Distorted Supply Voltages	Kiran Yadav	2019
31	Non Contact Measurement of Current Using Hall Effect Sensors	Rohan Gardia	2019
32	Single Phase Grid Synchronisation of PV System	Abani Kumar	2019
33	Direct Torque Control of Permanent Magnet Synchronous Machine Drive	Gonella Venkata Kameswara Sai Sampath	2020
34	Design of a BLDC Drive System based on a Compact Decoding Algorithm	Akash Verma	2020
35	Design Of Photovoltaic based Stand-Alone Quick Battery Charger with Maximum Power Point Tracker using Sepic Converter with Residual Power Extraction	Mulpuri L N Sai Krishna	2020
36	Design of Quick Battery Charger using the Direct Power Controlled Voltage Source Rectifier	Bathala Venugopal	2020
37	Design of Passive and Active Shunt Load Compensators for Power Quality Improvement in a Three Phase Power System	Dadabada Haneesha	2020
38	A Study of Direct Power Control Techniques for Voltage Source Converter	Niharika Dalai	2021
39	The Direct Torque Control of a Permanent Magnet Synchronous Motor Drives	Kalyampudi Bhargav	2021
40	Design Of Shunt Load Compensators for Power Quality Improvement in a Three Phase Power System	Tarun Kumar Varshney	2021
41	Load Compensation of Unbalanced and Distorted Voltages In 3-Phase Voltage Sources	Seera Anil Kumar	2021
42	Study Of Instantaneous Reactive Power Compensators Comprising Switching Devices Without Energy Storage Components	Rahul Pradhan	2022
43	Optimal Switching Sequence Direct Power Control of AC/DC Converters	Ballipara Rakshith	2022
44	Estimation Of Coupling Inductance In A Direct Power Control Based Three Phase AC/DC Rectifiers	Shatdarsanam Sai Sree Latha	2022
45	Reduction of Current Unbalance in Distribution Network with Rooftop Photovoltaic Cells	Aaditya Dewangan	2023
46	Contactless Current Measurement for Enclosed Multi-Conductor System based on Sensor Array	Shobha Kumari	2023
47	A Novel Method of Load Compensation under Unbalanced and Distorted Voltages	Rahul Kumar Paswan	2023

B.TECH PROJECT GUIDANCE

Sl. No.	**Title**	**Student's Name**	**Year of Award**
1	Low cost automatic water level control for domestic applications	Murmu, Ishwar Chandra and Yadav, Laloo Kumar	2013

2	Virtual instrument based fault detection in three phase circuit	Malik, Alok and Nayak, Biswabhusan	2013
3	Analysis and Simulation of Direct Torque-Controlled Induction Motor Drive	Arpit Mohanty & Amrit Sahoo	2014
4	Study of Single Phase Shunt Active Power Filter	Swayam Saswat	2014
5	Implementation of Fuzzy Logic Controller for the Control of Load Frequency in Two Area Power System	Jagadish Kumar Sethy & Nirakar Rout	2014
6	Extraction of Symmetrical Components and Fault Indication	Akshaya Kumar Sahu	2015
7	Simulation Study of Symmetrical Components and Implementation of Phase Sequence Indicator	Yashaswee Vijay Krishna	2016
8	Design And Development of a Phase Sequence Indicator	Gaurab Dash	2017
9	Study of Transformer Winding Deformation using Thomson's Ring Experiment.	Avinash Paul	2017
10	Implementation of Linearizing Digitizer for Wheatstone Based Resistive Sensor	Smarak Lenka & Akash Sahoo	2018
11	Design of Absolute Rotary Encoder (Optical)	Peruka Teja	2018
12	A Contactless Angular Sensor With floating Wiper for Displacement To Digital Conversion	Debraj Chatterjee	2019
13	Current Measurement of Two-Wire Zip-Cords and Measurement of Angle using Hall Sensor	Harsh Diwakar	2019
14	Power Current Measurement with Coreless Hall Effect Sensor	Mareedu Kishore Babu	2020
15	Study of Single Phase Hybrid Active Power Filter	Amit Kumar	2020
16	Circular Array of Magnetic Sensors for Current Measurement: Analysis for Error Caused by Position of Conductor	Medarametla Narendra	2020
17	Detection of Winding Deformation in Power Transformer	Pruthak Swain, Omkar Das & Siddhant Shatapathy	2021
18	Simulation of DC Microgrid Powered by PV System and Wind System	Mohammad Shakir Khan	2021
19	Virtual Instrumentation-Based Water Level Control	Madhu Sudan Barman	2022
20	Power Quality Improvement using Active Power Filters (APF)	Arunav Sharma	2022
21	Dynamic Simulation of Single Phase Two Winding Transformer	Bocha Sai Charan & Karri Taraka Aditya	2023
22	Vehicle Detection System using Inductive Loop with Virtual Instrument	Prince Raj & Laxmikant Shamsundar Bhosale	2023

PUBLICATIONS

Journals

1. Abinash Rath and S. Gopalakrishna, “Reduced complexity model predictive direct power control for unbalanced grid,” in Electric Power Systems Research, vol. 234, Sep. 2024.

2. Abinash Rath, S. Gopalakrishna and M. Pattnaik, "Improved Sensorless DPC With Constant Switching Frequency for Non-Ideal Grid," in *IEEE Transactions on Consumer Electronics*

3. Mallela Veeranjaneyulu, and S. Gopalakrishna, “A Novel method for current measurement in an off-centered conductor of a circular array current probe,” in Measurement, vol. 233, June 2024

4. Noby George, Prashanth Vooka, A. Sai Kartheek Bandi, S. Gopalakrishna, “A novel dual slope conversion technique for measurement of ratio and phase errors of current transformer using comparison method of testing,” in Measurement, vol. 179, 2021,

5. Mallela Veeranjaneyulu, and S. Gopalakrishna, “A novel coreless current sensing mechanism for two-wire power cord,” in Measurement, vol. 231, pp. 1-15, 31 May, 2024

6. Mendi Balaji, Monalisa Pattnaik, and S. Gopalakrishna, “A single current sensor based adaptive step size MPPT control of a small scale variable speed wind energy conversion system,” in Applied Energy, vol. 357, pp. 3316-3330, pp. 1-12, 1 Mar., 2024.

7. Mendi Balaji, Monalisa Pattnaik, and S. Gopalakrishna, “Design, analysis, and adaptive maximum power point tracking control of small-scale wind turbine system,” in International Journal of Circuit Theory and Applications, vol. 51, no. 7, pp. 3316-3330, 22 Mar., 2023

8. Abinash Rath, S. Gopalakrishna, and Monalisa Pattnaik, “An Advanced Shunt Active Power Filter (SAPF) for Non-ideal Grid Using Predictive DPC,” in IETE Technical Review, vol. 40, no. 4, pp. 521-534, Oct., 2022

9. Abinash Rath, Amit Kumar and S. Gopalakrishna and Monalisa Pattnaik, “Power quality improvement using 18 sector algorithm based direct power control,” in International Transactions on Electrical Energy Systems, vol. 31, no. 10, pp. 1-22, 07 Jan., 2021

10. Abinash Rath, S. Gopalakrishna, and Monalisa Pattnaik, “An advanced virtual flux integrated multifold table-based direct power control with delay compensation for active front-end rectifiers,” in International Transactions on Electrical Energy Systems, vol. 31, no. 12, pp. 1-22, 07 Nov., 2021

11. N. George and S. Gopalakrishna, "Design and Development of a Differential Current Probe With High Misalignment Tolerance," in *IEEE Sensors Journal*, vol. 19, no. 16, pp. 7035-7042, 15 Aug., 2019.

12. Amit Kumar and S. Gopalakrishna, “Algorithm-based direct power control of active front-end rectifiers,” IET Power Electronics, vol.12, pp. 712-718, 2019

13. Noby George, Prashanth Vooka, A. Sai Kartheek Bandi, S. Gopalakrishna,"A novel dual slope conversion technique for measurement of ratio and phase errors of current transformer using comparison method of testing," in Measurement, vol. 179, 2021.

14. M. C. Joshi, S. Samanta and S. Gopalakrishna, "Frequency Sharing Based Control of Battery/Ultracapacitor Hybrid Energy System in the Presence of Delay," in IEEE Transactions on Vehicular Technology, vol. 68, no. 11, pp. 10571-10584, Nov. 2019,

15. N. George and S. Gopalakrishna, "Development of a New Low-Cost and Reliable Core-Less Current Probe for Conductor With Reduced Access," in *IEEE Sensors Journal*, vol. 17, no. 14, pp. 4619-4627, 15 July15, 2017.

16. Amit Kumar and S. Gopalakrishna, “A power quality enhanced grid voltage sensorless predictive direct power control for active front end rectifiers,” in Transactions of the Institute of Measurement and Control, vol.40, pp. 3809-3823-718, 2018.

17. S. Gopalakrishna, M. K. Ilampoornan and V. Jayashankar, "On the Mechanical Short-Time Rating of a Current Transformer," in *IEEE Transactions on Power Delivery*, vol. 24, no. 1, pp. 480-481, Jan. 2009.

18. A. Palani, S. Santhi, S. Gopalakrishna and V. Jayashankar, "Real-Time Techniques to Measure Winding Displacement in Transformers During Short-Circuit Tests," in *IEEE Transactions on Power Delivery*, vol. 23, no. 2, pp. 726-732, April 2008.

Conferences

1. B. Mendi, M. Pattnaik and S. Gopalakrishna, "Modified MPPT Control of a PMSG-based Standalone Wind Energy Conversion System using Single Voltage Sensor," *2023 7th International Conference on Computer Applications in Electrical Engineering-Recent Advances (CERA)*, Roorkee, India, 2023, pp. 1-6.
2. B. Mendi, M. Pattnaik and S. Gopalakrishna, "A Speed Sensorless Modified Perturb and Observe MPPT Scheme for Stand-alone PMSG based Wind Turbine System," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, Arad, Romania, 2022, pp. 338-342.

3. A. Rath and S. Gopalakrishna, "Delay Compensated Multifold Table (DCMST) Direct Power Control (DPC) with Duty Ratio Control," *2022 4th International Conference on Energy, Power and Environment (ICEPE)*, Shillong, India, 2022, pp. 1-6.

4. A. Rath and S. Gopalakrishna, "Battery Charging With Model Predictive DPC based-Converter Using Dynamic DC-link Reference," *2022 4th International Conference on Energy, Power and Environment (ICEPE)*, Shillong, India, 2022, pp. 1-6.

5. B. Mendi, M. Pattnaik and S. Gopalakrishna, "A Speed Sensorless Modified Perturb and Observe MPPT Scheme for Stand-alone PMSG based Wind Turbine System," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, Arad, Romania, 2022, pp. 338-342.

6. A. Rath and S. Gopalakrishna, "Dead Beat Predictive DPC based Battery Charging System Using Dynamic DC-link Reference," *2021 National Power Electronics Conference (NPEC)*, Bhubaneswar, India, 2021, pp. 01-06.

7. S. Jha, S. Mohanty and S. Gopalakrishna, "Design, Development, and Control of Rotary Module of Electromagnetic Actuator for Dynamic Mechanical Analysis Using Finite Element Method," *2018 15th IEEE India Council International Conference (INDICON)*, Coimbatore, India, 2018, pp. 1-6.

8. D. Haneesha and S. Gopalakrishna, "Simplified Techniques for Estimation of Compensator Impedances in Power Systems," *2020 First International Conference on Power, Control and Computing Technologies (ICPC2T)*, Raipur, India, 2020, pp. 390-395.

9. A. Kumar, S. Mishra and S. Gopalakrishna, "Virtual Flux based Enhanced Predictive DPC Technique for Grid Connected Converter with Improved Power Quality Performance," *2020 IEEE 9th Power India International Conference (PIICON)*, Sonepat, India, 2020, pp. 1-6.

10. N. George, P. V. Ooka and S. Gopalakrishna, "An Efficient Digitizer for Calibration of Instrument Transformers," *2018 IEEE 9th International Workshop on Applied Measurements for Power Systems (AMPS)*, Bologna, Italy, 2018, pp. 1-6.

11. M. C. Joshi, S. Samanta and S. Gopalakrishna, "Battery ultracapacitor based DC motor drive for electric vehicles," *2017 IEEE Region 10 Symposium (TENSYMP)*, Cochin, India, 2017, pp. 1-5.

12. N. George and S. Gopalakrishna, "Detailed study on error characteristics of core-less hall-effect current transducer," *2017 Eleventh International Conference on Sensing Technology (ICST)*, Sydney, NSW, Australia, 2017, pp. 1-6.

13. A. kumar Patel, N. George, S. Gopalakrishna and S. K. Sahoo, "Optimal high frequency model for analysis of winding deformation in power transformers," *2015 IEEE International Conference on Signal Processing, Informatics, Communication and Energy Systems (SPICES)*, Kozhikode, India, 2015, pp. 1-5.

14. S. K. Sahoo and S. Gopalakrishna, "Winding deformation analysis in power transformers using Finite Element Method," *Proceedings of the 2014 IEEE Students' Technology Symposium*, Kharagpur, India, 2014, pp. 341-346.

15. A. A. Mahapatra and S. Gopalakrishna, "Regenerative braking in induction motor drives in applications to Electric Vehicles," *2014 IEEE Students' Conference on Electrical, Electronics and Computer Science*, Bhopal, India, 2014, pp. 1-5.

16. G. Mishra and S. Gopalakrishna, "Design of passive high pass filter for shunt active power filter application," *2013 International Conference on Circuits, Power and Computing Technologies (ICCPCT)*, Nagercoil, India, 2013, pp. 17-21.

17. S. K. Nanda and S. Gopalakrishna, "Virtual instrument-based fault classification in power transformers using artificial neural networks," *2013 IEEE 1st International Conference on Condition Assessment Techniques in Electrical Systems (CATCON)*, Kolkata, India, 2013, pp. 169-173.

18. S. Gopalakrishna, B. George, V. Jayashankar and V. J. Kumar, "Virtual instrument to measure the magnetic properties of annealed components," *2011 IEEE International Instrumentation and Measurement Technology Conference*, Hangzhou, China, 2011, pp. 1-4.

19. S. Gopalakrishna, V. Jayashankar, J. K. V. and M. M. N., "Online assessment of winding deformation based on optimised excitation," *2010 IEEE International Workshop on Applied Measurements for Power Systems*, Aachen, Germany, 2010, pp. 84-89.

20. S. Gopalakrishna, M. K. Ilampoornan and V. Jayashankar, "Sensitive method for detection of winding deformation during short circuit test," *2008 International Symposium on Electrical Insulating Materials (ISEIM 2008)*, Yokkaichi, Japan, 2008, pp. 167-170.

21. S. Gopalakrishna, K. Kumar, B. George and V. Jayashankar, "Design margin for short circuit withstand capability in large power transformers," *2007 International Power Engineering Conference (IPEC 2007)*, Singapore, 2007, pp. 1262-1267.

PATENT

Title: A Robust and Non-Invasive Core-Less Current Transducer

Status: Granted, **Type**: National, **Date of filing**: 30/03/2016

Patent No: 512808, **Application Number**: 201631010944

SPONSORED PROJECTS

Co-investigator

Title	Agency	Duration	Amount (Rs.)	Status
Design and development of a low cost and efficient standalone photovoltaic system with three port convertor	DST	36 months	1702800/-	Completed
Design & Development of a bidirectional DC-DC Converter with power & Energy Management of Battery and Ultra capacitor for an Electric Bike with regenerative Braking	DST	36 months	4755520/-	Completed

CONFERENCE/SHORT TERM COURSE (STC)

Conference or STC	Title	Duration	Sponsoring Agency	Responsibility	Place
Conference	1st National Conference on Power Electronics Systems & Applications (PESA 2013)	March 16-17, 2013	DRDO, CSIR, IEEE Kolkata Section	Coordinator	EE Department, NIT Rourkela
STC	Power Electronics Systems and Applications [PESA-14]	March 28-30, 2014	NAMPET	Coordinator	EE Department, NIT Rourkela
STC	Power Electronics Design and MPPT Algorithm for PV Based System	05 Oct 2016 - 06 Oct 2016	TEQIP-II	Coordinator	EE Department, NIT Rourkela
STC	Condition Assessment of Power System Equipment (CAPSE-2023)	11 Apr 2023 - 15 Apr 2023	Self	Coordinator	EE Department, NIT Rourkela

INSTITUTE LEVEL RESPONSIBILITY

1. PIC Institute Electrical Maintenance from 15th April 2015 to 30th June 2017
2. PIC of Central Workshop from 04th July 2017 to 03rd July 2019
3. Warden of Verghese Kurien Hall, NIT Rourkela from 01st July 2024

DEPARTMENTAL RESPONSIBILITY

1. PIC of Electrical Machines Laboratory from 01 July 2015 to 30 June 2021
2. PIC of Electrical Measurements and Instrumentation Lab from 01 July 2013 till date
3. Faculty advisor in EE Department from 01 July 2013 to 30 June 2017
4. PIC Seminar in EE Department from 06 June 2022 till date