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Education

- 2019 – 2023 **Doctor of Philosophy (Ph.D.) in Power Systems.**
Department of Electrical Engineering,
Indian Institute of Technology (IIT) Patna, India, 801103.
Thesis title: *Design and Development of Wide Area Damping Controller for Inter-Area Oscillations in Large Power Systems.*
Supervisor: Dr. Sanjoy Kumar Parida, Associate Professor.
- 2016 – 2018 **Master of Technology (M.Tech.) in Power Systems.**
Department of Electrical Engineering,
National Institute of Technology (NIT) Patna, India, 800005.
- 2011 – 2015 **Bachelor of Engineering (B.E.) in Electrical and Electronics Engineering.**
Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV) Bhopal, India, 462033.

Experiences

- July 2024 – Pres. **Assistant Professor.**
School of Electrical and Computer Sciences,
Indian Institute of Technology Bhubaneswar, India, 752050.
Working on *Dynamic Stability and State Estimation of Power Systems.*
- March 2024 – July 2024 **Assistant Professor.**
Electrical Engineering Department,
National Institute of Technology Calicut, India, 673601.
Working on *Dynamic Stability and State Estimation of Power Systems.*
- Sep. 2023 – March 2024 **Control System Engineer.**
General Electric (GE) Renewable Energy, Noida, India.
Worked on *Dynamic Performance Study (DPS) for installation of STATCOM REE Tabernas, Spain and Tabuk, Saudi Arabia Projects.*
Prepared PSSe DPS report for REE Tabernas project and delivered three talks on PSSe tutorial: REE Tabernas STATCOM fault studies. Also, delivered a talk on the stabilizer design for power system applications.
- Nov. 2022 – April 2023 **Visiting Researcher.**
Advanced Power and Energy Center, EECS Department,
Khalifa University, Abu Dhabi, United Arab Emirates.
Topic: *Developing Control Strategies for Enhancing the Stability of the Power Systems with High Penetration of Renewable Energy Sources.*
Supervisor: Prof. Mohamed Shawky El Moursi.


Awards, Achievements and Recognitions

- 2024 **Prestigious IEEE PES Outstanding Doctoral Dissertation Award 2024 (Top 4 in the World)** from IEEE Power & Energy Society.
- International Travel Support** from Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India.



Awards, Achievements and Recognitions (continued)

- 2023  **Express Mode PhD Degree** from Indian Institute of Technology Patna.
- 2023  Prestigious **POSOCO Power System Award (PPSA) now GRID-India Power System Award (GIPSA) 2023** from Grid Controller of India (GRID-INDIA), Ministry of Power, Govt. of India.
-  Financial support from Central Power Research Institute (CPRI), Ministry of Power, Govt. of India under the Grant **CPRI/RD/TC/Trans/2022**.
- 2022  Financial support from Science and Engineering Research Board (SERB), Govt. of India under the Grant **CRG/2018/ 002915**.
- 2021  Three-year **Senior Research Fellowship (SRF)** at IIT Patna from Ministry of Education, Govt. of India.
- 2019  **Travel Grant** from Ministry of Education, Govt. of India to present paper in ISGT Europe.
-  Two-year **Junior Research fellowship (JRF)** at IIT Patna from Ministry of Education, Govt. of India.
- 2018  **Certificate of Excellence Award** during M. Tech from NIT Patna for being branch topper of the Electrical Engineering Department.
- 2016  **Graduate Aptitude Test in Engineering (GATE) 2016** qualified.
- 2014  Received **Bachelor of Engineering Degree with Honours**.


Research Interests

- 2019 – Pres.  Power System Dynamics and Control, Distributed and Decoupled Control, Dynamic Estimation in Power Systems, Inertia Estimation in Power Systems, Wide-Area Damping Control, Power System Frequency Control, and Soft Computing Applications.

Skills

- Languages  Hindi, English (International English Language Testing System (IELTS) qualified in 2023).
- Softwares  Matlab/SIMULINK[®], PSSE[®], OPAL-RT, L^AT_EX, MathType, Microsoft Office and Visio.

Reviewer

- 2020 – Pres.  IEEE Transactions on Power Systems, IEEE Transactions on Sustainable Energy, IEEE Transactions on Power Delivery, IEEE Transactions on Energy Conversion, IEEE Transactions on Industrial Informatics, IEEE Transactions on Industry Applications, IET Renewable Power Generation, IET Generation, Transmission & Distribution, Journal of Modern Power Systems and Clean Energy, Protection and Control of Modern Power Systems, Results in Control and Optimization, Electrical Engineering, Annual Conference of the IEEE Industrial Electronics Society (IECON), IEEE PES Innovative Smart Grid Technologies (ISGT), National Power Systems Conference (NPSC), IEEE PEDES and IEEE ETFG.

References

- 1 **Dr. Sanjoy Kumar Parida**
Associate Professor, Department of Electrical Engineering
Indian Institute of Technology Patna, Bihar, India
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References (continued)

- 2 **Prof. Mohamed Shawky El Moursi**
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Khalifa University Abudhabi, UAE
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- 3 **Dr. Ranjan Kumar Behera**
Associate Professor, Department of Electrical Engineering
Indian Institute of Technology Patna, Bihar, India
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- 4 **Dr. Nand Kishore Singh**
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Research Publications

Journals

1. **A. Prakash**, K. Kumar, and S. K. Parida, "A modal transformation approach to design reduced order functional observer-based WADC for low-frequency oscillations," *IEEE Transactions on Power Systems*, vol. 38, no. 4, pp. 3593-3604, 2023, doi: 10.1109/TPWRS.2022.3196787.
2. **A. Prakash**, M. S. El-Moursi, S. K. Parida and E. F. El-Saadany, "Design of Adaptive Damping Controller with Wide-Area Measurements Considering Unknown Power System Dynamics," *IEEE Transactions on Power Systems*, vol. 39, no. 3, pp. 5150-5162, May 2024, doi: 10.1109/TPWRS.2023.3321674.
3. K. Kumar, **A. Prakash**, and S. K. Parida, "A Novel Multi-Functional Observer Based Distributed WADC for Large Power System Using Modified Decoupled Control Approach," *IEEE Transactions on Power System*, 2024, doi: 10.1109/TPWRS.2024.3351369.
4. **A. Prakash**, R. K. Tiwari, K. Kumar, and S. K. Parida, "Interacting Multiple Model Strategy Based Adaptive Wide-Area Damping Controller Design for Wind Farm Embedded Power System," *IEEE Transactions on Sustainable Energy*, vol. 14, no. 2, pp. 962-973, 2023, doi: 10.1109/TSTE.2022.3231647.
5. **A. Prakash**, P. Singh, K. Kumar, and S. K. Parida, "Design of a reduced-order WADC for wind turbine system integrated power system," *IEEE Transactions on Industry Applications*, vol. 58, no. 3, pp. 3250-3260, 2022, doi: 10.1109/TIA.2022.3159319.
6. **A. Prakash**, K. Kumar, and S. K. Parida, "Energy capacitor system based wide-area damping controller for multiple inter-area modes," *IEEE Transactions on Industry Applications*, vol. 58, no. 2, pp. 1543-1553, 2022, doi: 10.1109/TIA.2022.3140713.
7. **A. Prakash**, M. S. El-Moursi, S. K. Parida, K. Kumar and E. F. El-Saadany, "Damping of Inter-Area Oscillations with Frequency Regulation in Power Systems Considering High Penetration of Renewable Energy Sources," *IEEE Transactions on Industry Applications*, vol. 60, no. 1, pp. 1665-1679, 2024, doi: 10.1109/TIA.2023.3312061.
8. K. Kumar, **A. Prakash** and S. K. Parida, "Large-Scale Solar PV Converter based Robust Wide-Area Damping Controller for Critical Low Frequency Oscillations in Power Systems," *IEEE Transactions on Industry Applications*, vol. 59, no. 4, pp. 4868-4879, 2023, doi: 10.1109/TIA.2023.3268632.

9. **A. Prakash**, K. Kumar, and S. K. Parida, "PIDF_(1+FOD) controller for load frequency control with SSSC and AC-DC tie-line in deregulated environment," *IET Generation, Transmission & Distribution*, vol. 14, no. 14, pp. 2751-2762, 2020, doi: 10.1049/iet-gtd.2019.1418.
10. **A. Prakash**, S. Murali, R. Shankar, and R. Bhushan, "HVDC tie-link modeling for restructured AGC using a novel fractional order cascade controller," *Electric Power Systems Research*, vol. 170, pp. 244-258, 2019, doi: 10.1016/j.epsr.2019.01.021.
11. **A. Prakash**, K. Kumar, and S. K. Parida, "Damping of Inter-Area Oscillations Using TCPS Based Delay Compensated Robust WADC," *Electric Power Components and Systems*, vol. 51, no. 15, pp. 1562-1575, 2023, doi: 10.1080/15325008.2023.2200772.
12. **A. Prakash**, K. Abhinav, P. Rai and S. K. Parida, "Distributed Generation Based WADC for Inter-Area Oscillations Considering Unknown Inputs," *Electric Power Components and Systems*, 2023, doi: 10.1080/15325008.2023.2258503.
13. P. Singh, **A. Prakash**, and S. K. Parida, "Neural Network Based Pattern Recognition for Classification of the Forced and Natural Oscillation," *Electric Power Systems Research*, vol. 224, pp. 109706, 2023, doi: 10.1016/j.epsr.2023.109706.
14. K. Abhinav, P. Rai, **A. Prakash**, and S. K. Parida, "A Data-Driven Online Approach for Detection and Localisation of Forced Oscillation in Wind Turbine Integrated Power System," *Electric Power System Research*, vol. 233, pp. 110512, 2024, doi: 10.1016/j.epsr.2024.110512.
15. P. Sharma, **A. Prakash**, R. Shankar, and S. K. Parida, "A novel hybrid salp swarm differential evolution algorithm based 2DOF tilted-integral-derivative controller for restructured AGC," *Electric Power Components and Systems*, vol. 47, no. 19-20, pp. 1775-1790, 2019, doi: 10.1080/15325008.2020.1731870.

Unpublished

16. **A. Prakash**, M. S. El-Moursi, S. K. Parida and R. K. Tiwari, "Decentralized Adaptive Unscented Filtering Based Distributed Wide-Area Damping Controller," *IEEE Transactions on Power Systems* (Under review).
17. P. Saini, K. Abhinav, **A. Prakash**, S. K. Parida, and R. K. Saini "Improved Inertia Estimation Using Isolation Forest and Attention-Augmented Encoder-Decoder Model," *IEEE Transactions on Power Systems*, (Under review).
18. K. Kumar, **A. Prakash**, K. A. Jaafari, S. K. Parida, H. H. Zeineldin, and E. F. El-Saadany, "Real-Time Cyber-Physical Testbed Co-simulation with Hardware-in-the-Loop for Controller Testing in Modern Power Systems," *IEEE Transactions on Industry Applications*, (Under review).
19. K. Kumar, **A. Prakash**, K. A. Jaafari, and S. K. Parida, "A Novel Modal Eigenvalue Realignment Based Design of Wide-Area Damping Controller for Inter-Area Oscillations in Modern Power System," *IEEE Transactions on Power Systems*, (Under first revision).
20. P. Saini, K. Abhinav, **A. Prakash**, and S. K. Parida, "i-XGB: An Energy Efficient Approach for Continuous Inertia Tracking in Ambient Conditions," *IEEE Transactions on Industry Applications*, (Under first revision).
21. S. Ghosh, and **A. Prakash**, "Adaptive ADMM Based Online Damping Controller for Critical Inter-Area Oscillations," *IEEE Transactions on Power Systems*, (Under review).
22. P. Singh, **A. Prakash**, and S. K. Parida, "Analysis and Identification of Nonlinear and Non-stationary Forced Oscillations through Hilbert Spectrum Analysis," *IEEE Transactions on Sustainable Energy*, (Under review).
23. K. Kumar, **A. Prakash**, P. Saini, K. A. Jaafari and S. K. Parida, "Adaptive Delay-Compensated Sparse WADC for Mitigating Inter-Area Oscillations in Power Systems with High Renewable Energy Penetration Amidst Communication Loss," *IEEE Transactions on Power Delivery*, (Under review).

24. **A. Prakash**, M. S. El-Moursi, S. K. Parida and R. K. Tiwari, "Adaptive Second-Order Extended Kalman Filtering based Data Driven Damping Controller for Power Systems," *IEEE Transactions on Power Systems* (Under preparation).
25. K. Abhinav, P. Rai, **A. Prakash**, and S. K. Parida, "Data-Driven Localization and Detection of Forced Oscillation in Wind Farm Integrated Power System," *IEEE Transactions on Power Systems*, (Under preparation).
26. P. Singh, **A. Prakash**, K. Kumar, and S. K. Parida, "Forced Oscillation Detection Using Multisynchrosqueezing Transform with Enhanced Feature Extraction and Classifier Techniques," *IEEE Transactions on Industry Applications*, (Under preparation).

Book

27. S. K. Parida, R. Shankar, and **A. Prakash**, "*Modern Approach to Load Frequency Control in Power Systems*," **CRC Press** (Under preparation).

Patent

28. K. Kumar, **A. Prakash**, and S. K. Parida, "A Low-Cost Real-Time Controller Testing and Development Framework for Power System Applications," **Indian Patent** (IN 202431005767, Filed Jan 29, 2024).

Conferences

29. **A. Prakash**, K. Abhinav, P. Rai, and S. K. Parida, "A Sine-Cosine Algorithm Optimized PI-PD Cascade Controller for Load Frequency Control," *2024 IEEE International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024.
30. **A. Prakash**, K. Abhinav, P. Saini, and S. K. Parida, "Frequency Control of Two Area Thermal Hydro System Using HSSDEA Based PIDF Controller," *2024 IEEE International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024.
31. **A. Prakash** and S. K. Parida, "Impact of Solar Photovoltaic on LFC of Interconnected Power System using I-PD Controller," *2019 IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe)*, 2019, doi: 10.1109/ISGTEurope.2019.8905696.
32. **A. Prakash**, M. S. El-Moursi, S. K. Parida and E. F. El-Saadany, "Design of Wide Area Damping Controller Based on Clustering of Inter-Area Oscillations," in *2023 IEEE PES Conference on Innovative Smart Grid Technologies - Middle East (ISGT Middle East)*, 2023, doi: 10.1109/ISGTMiddleEast56437.2023.10078566.
33. **A. Prakash**, K. Kumar and S. K. Parida, "Design of Damping Controller Based on the Wide-Area Signal Strength," *2020 21st National Power Systems Conference (NPSC)*, 2020, doi: 10.1109/NPSC49263.2020.9331866.
34. **A. Prakash** and S. K. Parida, "Combined Frequency and Voltage Stabilization of Thermal-Thermal System with UPFC and RFB," *2020 IEEE 9th Power India International Conference (PIICON)*, 2020, doi: 10.1109/PIICON49524.2020.9113034.
35. **A. Prakash**, P. Singh, K. Kumar and S. K. Parida, "Design of TCSC Based Optimal Wide Area Power System Stabilizer for Low-Frequency Oscillation," *2021 IEEE IAS 4th International Conference on Computing, Power and Communication Technologies (GUCON)*, 2021, doi: 10.1109/GUCON50781.2021.9573982.
36. **A. Prakash** and S. K. Parida, "LFC of Interconnected Power System with TCSC using Salp Swarm Algorithm," *2019 8th International Conference on Power Systems*, 2019, doi: 10.1109/ICPS48983.2019.9067729.
37. **A. Prakash** and S. K. Parida, "LQR Based PI Controller for Load Frequency Control with Distributed Generations," *2020 21st National Power Systems Conference (NPSC)*, 2020, doi: 10.1109/NPSC49263.2020.9331761.
38. **A. Prakash**, K. Kumar and S. K. Parida, "A novel I-PDF controller for LFC with AC/DC Tie-line," *2019 20th International Conference on Intelligent System Application to Power Systems (ISAP)*, 2019, doi: 10.1109/ISAP48318.2019.9065929.

39. **A. Prakash**, K. Kumar and S. K. Parida, "Design of Wide-Area Damping Controller Based on Modulation of Active Power Demand," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, pp. 176-181, 2022, doi: 10.1109/GlobConET53749.2022.9872521.
40. **A. Prakash**, P. Saini and S. K. Parida, "Distributed Generation Based Design of Prescribed Degree Robust Wide Area Damping Controller for Inter-Area Oscillations in Power Systems," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10431168.
41. K. Kumar, **A. Prakash**, P. Singh and S. K. Parida, "A Novel SVC Based Wide-Area Damping Controller for Inter-Area Oscillation," *2021 IEEE 4th International Conference on Computing, Power and Communication Technologies (GUCON)*, 2021, doi: 10.1109/GUCON50781.2021.9573946.
42. P. Singh, **A. Prakash**, K. Kumar and S. K. Parida, "Comparative Assessment of Spectral Analysis Methods for Characterizing Forced Oscillation," *2021 9th IEEE International Conference on Power Systems (ICPS)*, 2021, doi: 10.1109/ICPS52420.2021.9670399.
43. K. Kumar, **A. Prakash**, S. K. Parida, S. Ghosh and C. Kumar, "Coordinated Tuning of AVRs and PSSs for Local and Inter-Area Modes of Oscillation in Eastern Regional Grid of India," *2021 IEEE 2nd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2021, doi: 10.1109/STPEC52385.2021.9718621.
44. K. Kumar, **A. Prakash** and S. K. Parida, "A Novel PID-FOPD Controller for LFC Including IPFC and RFB," *2021 6th International Conference for Convergence in Technology (I2CT)*, 2021, doi: 10.1109/I2CT51068.2021.9417977.
45. S. Murali, **A. Prakash** and R. Shankar, "LFC of Multi Area Power System with Electric Vehicle using VPL Optimized Controller," *2019 International Conference on Power Electronics Applications and Technology in Present Energy Scenario (PETPES)*, 2019, doi: 10.1109/PETPES47060.2019.9003878.
46. P. Singh, **A. Prakash** and S. K. Parida, "Analysis and Detection of Forced Oscillation Using Synchrosqueezed Wavelet Based Ridge Technique," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, pp. 417-422, 2022, doi: 10.1109/GlobConET53749.2022.9872167.
47. K. Kumar, **A. Prakash** and S. K. Parida, "Robust Wide-Area Damping Controller for Inter-Area Oscillation with AC/DC Tie-Line," *2022 IEEE IAS Global Conference on Computing, Power and Communication Technologies (GLOBCONPT)*, 2022, doi: 10.1109/GlobConPT57482.2022.9938364.
48. K. Kumar, **A. Prakash** and S. K. Parida, "Wide-Area Damping Controller Design with TCSC Using Active Disturbance Rejection Control," *2023 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, 2023, doi: 10.1109/GlobConET56651.2023.10150111.
49. P. Saini, **A. Prakash** and S. K. Parida, "Enhanced Short-Term Load Forecasting Using Facebook Prophet and Discrete Wavelet Transform," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10430521.
50. K. Abhinav, P. Rai, **A. Prakash** and S. K. Parida, "Comparative Assessment of Prony Analysis and Eigen-system Realization Algorithm for Forced Oscillation Detection and Mode Estimation Considering PMU Noise," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10430933.
51. K. Abhinav, P. Rai, **A. Prakash** and S. K. Parida, "A Data-Driven Forced Oscillation Detection Using Random Forest," *2023 IEEE International Conference in Energy Technologies for Future Grids (ETFG)*, 2023, doi: 10.1109/ETFG55873.2023.10408579.
52. P. Saini, K. Abhinav, **A. Prakash**, and S. K. Parida, "Adaptive Disturbance Onset Detection in Power System with Varying Wind Power Penetration Using Kernel Density Estimator," *2024 22nd National Power Systems Conference (NPSC)*, 2024.

53. K. Abhinav, P. Rai, P. Saini, **A. Prakash**, and S. K. Parida, "Forced Oscillation Source Location using System Oscillating Energy and Eigensystem Realization Algorithm," *2024 22nd National Power Systems Conference (NPSC)*, 2024.
54. K. Kumar, P. Saini, **A. Prakash**, and S. K. Parida, "Detection and Mitigation of False Data Injection Attacks in Wide-Area Damping Controller Using Random Forest Classifier," *2024 22nd National Power Systems Conference (NPSC)*, 2024.
55. P. Rai, K. Abhinav, P. Saini, **A. Prakash**, and S. K. Parida, "Detection of Wind Turbine Induced Forced Oscillations using Periodogram and DEF Techniques," *2024 IEEE International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024.