

Deepika Chhetija

R&D Assistant Staff

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Research Interest

Power system protection, Microgrids, Inverter based sources, Inverter control, Fault models of inverters, Distribution networks, Power islands, Machine learning.

Education

- 2019 - 2024 **PhD | Prof. Suryanarayana Doolla, Prof. Zakir H. Rather, IIT Bombay**
Energy Science & Engineering (CGPA: 8.5/10)
- 2014 - 2016 **M.Tech, Power Systems | Prof. Biswarup Das, Prof. Vinay Pant, IIT Roorkee**
Electrical Engineering (CGPA: 7.91/10)
- 2005 - 2009 **B.Tech | Prof. Ashok Kumar Sharma, Rajasthan Technical University, Kota**
Electrical Engineering (Per: 71.01%)

Research Experience

- 2019-2024 **Protection of inverter dominated distribution networks**
Supervisor: Prof. Suryanarayana Doolla, Prof. Zakir H. Rather (IIT Bombay)
The fault signatures of inverter based sources largely varies with its control structure unlike conventional synchronous generator based sources. Therefore, they impose challenges to conventional power system protection schemes. Solution to this, new fault detection, classification and location schemes are developed for inverter dominated distribution networks in both grid connected and islanded mode, in this project.
- 2014-2016 **Location of faulted line section in distribution system**
Supervisor: Prof. Biswarup Das, Prof. Vinay Pant (IIT Roorkee)
To provide the uninterrupted power supply to consumers it is necessary to isolate the faulty section and restore the system quickly. Distribution system fault section estimation techniques are taking heed as utilities are competing with each other and working in deregulated scenario to readily provide uninterrupted power supply to consumers. In this regard, a non-iterative fault location scheme is implemented for unbalanced distribution networks.

Work Experience

- Sep. 2024-Till date **R&D Assistant Staff, Oak Ridge National Lab, Knoxville, USA**
Working on power system protection projects with high penetration of renewables in distribution networks.
- 2017-2019 **Adhoc faculty, Sardar Vallabhbhai National Institute of Technology, Surat**
Various subjects taught to Btech students; Power system operation and control, Network Analysis, Electrical Measurements, Electrical Machines and laboratory experiments of application of power electronics in power systems and power system analysis.
- 2016-2017 **Assistant Professor, IFTM University, Moradabad**
Taught subjects: Power plant engineering, Electrical circuits, Laboratory experience: Electrical machine laboratory, and Electrical measurements lab experiments
- 2011-2013 **Junior Engineer, Rajasthan Rajya Vidyut Utpadan Nigam Limited, Rajasthan**
Worked as an operation engineer in 2*250 MW Chhabra thermal power station. Hot and cold startup of boiler, unit synchronization and turbine rolling were the main responsibilities.
- 2010-2011 **Assistant System Engineer, Tata Consultancy Services, Chennai**
Worked on Mainframes and Teradata based Bank of America project with credit card development team.

Internships

- 2011 **National Power Training Institute (NPTI), Faridabad (40 days)**
Training on power plant familiarization, which includes lectures on basics of power generation and various plant visits.
- 2007 **National Thermal Power Plant, Anta (30 days)**
Training in a combined cycle gas power plant of 413 MW, which includes the lectures and visit.

2008 **Kota Super Thermal Power Station, Kota** (40 days)
Training in a coal based power plant of 1045 MW, which includes the lectures and visit.

Publications

Journals:

- Deepika Chhetija, Dhiraj Khadka, Yusuf Gupta, Zakir Hussain Rather, Suryanarayana Doolla, "Fault detection and classification scheme for power islands with inverter interfaced distributed generators," in *Electric Power Systems Research*, Vol. 233, 2024.
- D. Chhetija, Z. H. Rather and S. Doolla, "Fault Location Identification in Power Islands With Inverter Interfaced Distributed Generators," in *IEEE Transactions on Instrumentation and Measurement*, vol. 73, pp. 1-10, 2024.
- D. Chhetija, Z. H. Rather and S. Doolla, "A Communication-Free Fault Detection and Classification Scheme for Power Islands," in *IEEE Transactions on Industry Applications*, vol. 60, no. 3, pp. 4921-4932, May-June 2024.
- D. Chhetija, I. Khan, Z. H. Rather and S. Doolla, "Decentralized Negative Sequence Power Based Protection Scheme for Active Power Islands" in *IEEE Transactions on Industry Applications*, 2025 (Early Access).

Conferences:

- D. Chhetija, I. Khan, Z. H. Rather and S. Doolla, "On the Fault Behavior of Inverter Controllers: Impact on Protective Relaying," 2023 IEEE Industry Applications Society Annual Meeting (IAS), Nashville, TN, USA, 2023, pp. 1-6.
- D. Chhetija, I. Khan, Z. H. Rather and S. Doolla, "Negative Sequence Power based Fault Detection Scheme for Power Islands during Unbalanced Faults", in *2023 IEEE International Conference on Environment and Electrical Engineering and 2023 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I & CPS Europe)*, Madrid, Spain, 2023, pp. 1-5.
- D. Chhetija, Z. H. Rather and S. Doolla, "A Communication-free Fault Detection and Classification Scheme for Industrial Microgrids", in *2022 IEEE Industry Applications Society Annual Meeting (IAS)*, Detroit, MI, USA, 2022, pp. 1-6.
- S. S. Rao, Z. H. Rather, D. Chhetija and S. Doolla, "Impact of Electric Vehicle Integration on Short Circuit Capacity of Distribution Network," 2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC), Bhubaneswar, India, 2023, pp. 1-6
- D. Chhetija and M. Ferrari, "Investigation of fault detection and coordination in inverter dominated networks: Sequence components based approaches", in *2025 IEEE Power & Energy Society General Meeting (PESGM)*, Austin, Texas, USA. (Accepted)

Skills

Proficient in: MATLAB, Simulink, PSCAD, C, Opal-RT Real time simulator, $\LaTeX$, Inkscape, Visio, MS Office
Familiar with: DIGSILENT Power factory, Python, Typhoon-HIL
Languages: English, Hindi, Gujarati

References

Prof. Suryanarayana Doolla

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Prof. Zakir H. Rather

Professor, Department of Energy Science & Engineering, IIT Bombay, India
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