

Kamakshi Tatkare

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RESEARCH INTEREST

Modeling of Inverter Based Resources, Optimization and Controls in Low Inertia Power Systems

EDUCATION

The University of Texas at Austin

Texas, USA

MS-PhD, Electrical and Computer Engineering - Power Systems and Power Electronics; GPA: 3.76/4 2021-2027

Veerмата Jijabai Technological Institute

Mumbai, India

B.Tech, Electrical Engineering; GPA: 8.85/10 2016-2020

RESEARCH EXPERIENCE

Masters Thesis

TX, USA

Data Driven Modelling of 3 Phase Inverters using Power Hardware-in-the-loop Experiments Fall 2022 - Present

- Formulating a Neural Network driven model of a SMA Tripower Inverter
- Integrating the mathematical model in EMT software to simulate fault conditions

Kumaraguru Prabakar (PSEC, NREL)

National Renewable Energy Laboratory

CO, USA

Graduate II Electrical Engineer May 2022 - December 2022

- Modelled a 3 phase Commercial Grid Following Inverters using Non Linear System Identification
- Implemented Hammerstein-Weiner and NARX on MATLAB for comparing existing modelling techniques
- Modelled single phase Inverter using Linear Scikit-learn estimators like LASSO, Ridge and SGD
- Built Inverter NARMAX model using SysIdenPy Python package to improve accuracy
- Performed EMT simulation of a modified 13 Bus IEEE Test System using PSCAD
- Responsible for IP Management of Grid Forming Inverters for UNIFI Consortium
- Selected as one of the 3 women in USA who represent the first cohort of Women in Power Systems for G-PST
- **Mentor: Ben Kroposki (PSEC, NREL)**

Under Graduate Thesis

Mumbai, India

Optimal Placement and sizing of Distributed generation using Genetic Algorithm Fall 2019 - Spring 2020

- Applied Newton Raphson numerical method to find load flow solution on IEEE 33 bus network
- Formulated Voltage Sensitivity Index to find optimal location of Distributed Generation
- Utilized Genetic Algorithm function for optimal sizing of Distributed Generation
- **Advisor: Harish Chaudhari (Veerмата Jijabai Technological Institute)**

WORK EXPERIENCE

Graduate Teaching Assistant

TX, USA

The University of Texas at Austin

Jan 2022 - May 2022

- Taught Magnetism, Electricity and Optics Experiments to 38 undergraduates with TA rating of 4.5/5
- Updated Physics Lab II material and Graded lab reports, projects and quizzes for instructor Andrew Loveridge

Electrical Engineering Intern

Mumbai, India

Godrej Electrical and Electronics

December 2018 - January 2019

- Designed residential Solar Plants using PVSyst Software
- Conducted performance analysis of commercial Photovoltaic plants across various locations in India
- Studied integration of residential PV system with grid

Industrial Trainee

Mumbai, India

Brihan Mumbai Electric Supply and Transport Undertaking

May 2018-June 2018

- Report on South Mumbai's Power systems Operations, Control and Protection for the distribution utility

PROJECTS

Optimization in Energy Markets using Mathematical Programming with Equilibrium Constraints

- Formulated bilevel optimization problem for integration of Energy Storage and Conventional energy resources
- Benchmarked inner level formulation of Energy storage placement and base load plants on a 3 bus network
- Demonstrated the effectiveness and complexity of the problem using YALMIP, SeDuMi solver on MATLAB

Power Flow of an Islanded Single-phase 240V Microgrid

- Implemented snapshot power flow and QSTS of an islanded 3-bus microgrid system for base case, varying PV, and Energy storage droop settings
- Performed Power flow considering SoC considerations, Grid-supporting PV power limit, Energy storage capacity limitation and adding more PV resources and proposed droop control setpoints for optimal performance

Design of H-Bridge Inverter circuit

- Designed PWM control stage and Power stage of H-Bridge Inverter Circuit
- Proposed MOSFETs, Bootstrap Capacitor, Bootstrap diode based on design specification for the Inverter
- Achieved efficiency of 95.95 percent
- Integrated and synchronized PV Panels to grid using designed buck-boost converter and the h-bridge inverter

Solution to Austin Energy's RFP for replacement of Fayette Coal Fired Plant with renewable energy

- Performed Life Cycle Cost Analysis using data from OpenEI of Solar, Wind and CHP plants
- Built Financial Model using System Advisory Model to estimate Investment prospects
- Utilized legal Contracts, Permits and Tax abatements to optimize solution to RFP
- Proposed project development of 250 MW Solar site, 150 MW Coastal Wind, 460 MW of Houston CHP with a sponsor IRR of 8.4 percent considering Price, Deliverability and Renewable goals of Austin Energy

COURSE WORK

- **Power Systems:** Analysis of Power Systems with Renewable Energy resource, Power System Apparatus and lab, Power Quality, Power Systems (Analysis, Control, Protection, Planning), FACTS devices, High Voltage Engineering, Microgrids, Energy Development Policy, Energy Conservation and Management
- **Controls and Optimization:** Advanced Control Systems, Control Systems Laboratory, Power System Optimization-Control, Energy System Operation-Optimization, Optimization Techniques, Numerical Methods
- **Power Electronics:** Power Electronics Devices and Systems Laboratory, Drives and Control Laboratory

SKILLS SUMMARY

- **Languages:** Python, MATLAB, C++, RUST
- **Simulation Tool:** PSCAD, EMTP, LTspice PowerWorld, OpenDSS, Simulink
- **Visualization Tool:** Tableau, PowerBI, Excel, AutoDesk Fusion 360, Solidworks, AutoCad, Adobe Illustrator, Figma

INDUSTRIAL DESIGN

- National Institute of Design's Industrial design portfolio exam (July, 2021) - All India Rank 18
- National Institute of Design's Design aptitude test (March, 2021) - All India Rank 3
- Common Entrance Exam for Product, Communication and UX design (January, 2021) - All India Rank 79

VOLUNTEERING

Tahaan NGO

Content writer and Blog Editor

- Researched on Energy-Water nexus, Climate Change, Drought resistance and Water crisis in India
- Articles: tahaanefforts.com/kamakshi

Pune, India

Sept 2019 - Aug 2021