

Araz B. Karimi

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EDUCATION

Georgia Institute of Technology — Atlanta, GA

January 2021-December 2022

Master of Science in Electrical and Computer Engineering (GPA: 3.5/4)

The University of Tehran — Tehran, Iran

September 2018-December 2020

Master of Science in Electrical Engineering (GPA: 3.7/4)

Tabriz University — Tabriz, Iran

September 2014-July 2018

Bachelor of Science in Electrical Engineering (GPA 3.9/4)

EXPERIENCE

Custom Engineering Solutions — Atlanta, GA

September 2023-Present

Electrical Engineer II

- Substation Protection and Control Drafting and Designing (DC and AC Elementaries, SCADA, Panel Fabrication, Wiring and Interconnection) Using AutoCAD
- Protection Relay and SCADA settings and programming such as SEL 351s, 387, 787 and 735
- ETAP Power Flow Study and Protection Coordination Report Preparation for Clients
- Transmission line Design with PLS-CADD

Black & Veatch United States — New York, NY

December 2022-August 2023

Electrical Engineer I (Substation Designer)

- Brownfield and greenfield Protection and Control drawing preparation and QA including breaker, line, bus protection panels, SCADA, Fiber, Communication
- LV AC and DC distribution drawings and calculations, Cable estimates, Bill of Material (BOM) preparation, and QA
- Substation calculations such as voltage drop, conduit raceway, station service AC Load, battery, and battery charger sizing (DC calc.), Lightning and Illumination with professional report preparation based on IEEE, NEC, and Company Standards
- 345KV, 230KV, 138KV, and 69KV Physical equipment above grade and below grade layout, section elevation, details, Conduit, Grounding, and cable trench drawings (Both GIS and AIS)
- 4KV Switchgear physical and P&C drawings
- Construction RFIs, Document filing, PEP, PDM preparation, Status meeting running, and drawing/drafting requests.
- SCADA, RTU, HMI setting with IP, Modbus, DNP, and IEC 61850 for SEL RTAC, NovaTech Orion, and RUGGEDCOM.

Center for Distributed Energy and PSS Lab — Atlanta, GA and Tehran, Iran

January 2019 - August 2022

Research and Teacher Assistant, Web Developer, Lab Holder

- Inverter Sizing and Storage Placement, Inverter control mode optimization, and small signal stability for damping improvement with MATLAB AND PSCAD, Power System Protection Relay Library Development in MATLAB Simulink
- Energy conversion Lab Holding includes Debugging and troubleshooting of circuits, including Power Electronics, Solar cells, wind turbines, and electrical machines using oscilloscopes and meters Regular device testing and lab preparation.

East Azerbaijan Distribution Electrical Co. — Tabriz, Iran

August 2018 – December 2018

Power System Engineer

- Developing an Automated Short Circuit Contingency and Unit Placement Calculation Add-on for PSS/E using C++
- Short-Circuit and Interconnection Study of Renewable Sources in 20KV Distribution system using DigSILENT
- Distribution System Design Review with Renewable Integration

Tabriz Thermal Power Plant — Tabriz, Iran

June 2017 – September 2017

Intern (Electrical and Mechanical)

- Field Experience with 20kV 150MW Stream Turbine Generators, 4kV Switchgear, Transformers, Boiler, 138KV Substation, and other electrical equipment in different voltage classes.
- Modeling of Power Generation Plant with internal Loads and performing motor starting studies to determine the resiliency of the system in Black Start.
- Generation System, P & C, and Physical drawings review, and update based on field Situation. (As-Built Preparation)

CERTIFICATES AND PROFESSIONAL TRAINING

OSHA 10-hour Construction Safety and Health – E.I.T in Progress

Last updated March 01, 2024

SKILLS (For a Full List Please Refer to [Portfolio Skills sheet](#))

- **Study Software:** PSCAD, PSS/E, Simulink, CYME, ETAP, SKM, GRIDVIEW, PROMOD, Plexos, PowerGem TARA, ASPEN
- **Design Software:** Revit, COMSOL, Bluebeam, PVSyst, PLS-CADD, PLS-POLE, Bentley MicroStation
- **Coding:** Python, VBA Macro (Word, Excel, Outlook), MATLAB, Shell Scripting, JavaScript, C++, SQL, , Git, HTML, CSS
- **Study Calculation:** Power Flow, Power Market Analysis, Short-Circuit, State Estimation, Unit Commitment, Contingencies, and reliability planning, Motor Starting, Arc Flash, AC DC load Calculation, Load Forecasting, Generation Interconnection, Demand Response, Microgrids, Harmonics, Reactive Power, Voltage Drop
- **Design Calculation:** Lighting, Lightning, Battery sizing and placement, Grid code compliance (NEC, IEC, IEEE, ANSI), BESS Design, Inverter Design, Racking and wiring, Control house and switchyard design, transformer bushing design, relay, and SCADA setting.

ACADEMIC COURSES

Power System Digital Protection - Control, and Stability of Microgrids - Power Quality - Power System Dynamics I - Electrical Energy System Analysis - Distribution Network Design - High Voltage Substations - Transmission Line Design - High Voltage Technology -

NOTABLE PROJECTS (For a Full List Please Refer to [Portfolio Projects Sheet](#))

Inverter Integrated Power System Modeling and EMT level Study using PSCAD ([specific link 1](#))([specific link 2](#))

A Wind Farm accurately modelled with Inverters, control schemes, and power elements and connected a power system with conventional generators, transmission lines and loads. Several studies including power swings, balanced and unbalanced fault types were analyzed under different conditions and different locations in order to observe the behavior of inverters and protection systems.

Power Flow and Arch Flash Study and review using ETAP (For Hyperloop Transport Technologies)

Power Flow Report Preparation of a Full Power System of a Utility Client, with automatic Word File creation with all warnings, tables, and figures for 60 Scenarios and Load Categories, Data Visualization of Relay DATA as Appendix. Feasibility study validation of a Hyperloop transportation line power system including inverters, switches, ESS, and PV system. Review of ETAP provided a conceptual design with power flow, short circuit, and arc flash calculations. Development of an optimization tool to select the cost-effective and compliant power system configuration and materials in Python.

Substation P&C and Physical Brownfield Design (via Black and Veatch for Ameren Utilities)

A remote end Relay change, another relay configuration change, a Line change, and line tuner removal is populated into more than 600 physical and P&C drawings of a substation. Whole schematics, and wiring SCADA and panels change performed accordingly Cable Sizing, Load Estimation, Transformer Selection, Relay Selection, and coordination using Bluebeam, MicroStation, and AutoCAD.

PV and EV Charger integrated distribution System Design using CYME and MATLAB ([specific link](#))

A MATLAB code is created to model the three-phase unbalanced system and then perform Optimal Power Flow with several existing and proposed engines. EVs and PVs are integrated as controllable objects into the model. Voltage imbalance (A power Quality measure) is implemented in the optimization as a constraint. Several Scenarios were tested, and Data Visualization about the Optimal Power Flow is created. An academic Paper is created upon this.

Digital Implementation of Protection relay logic, phase recognition, and a new Data-Driven Distance Relay

First Phase detector algorithms are modeled in MATLAB to extract the magnitude and angle of a signal during fault. On this basis relay protection logic such as Over-current, transformer differential, and distance with Power Swing Blocking is Modelled. Finally, a new method is proposed to improve the performance of the relay during power swings in the marginal faults using real-time spiral regression.

Overhead Transmission Line Design with PLS-CADD (For Custom Engineering Solutions)

Mechanical and Electrical Calculation, Specification, Drawing, installation guidelines for each Pole. Conductor selection, grid code compliance, and Technical Report. Exporting and viewing in Google Earth.

Residential Building Electrical Desing using Revit and Dialux (Course project in 2017)

Residential electrical circuit design includes illumination calculations with Dialux, Fire Alarms, Sensors, Receptacles, UPS System, Telecom system and pauer factor correction calculations. Drawings prepared using Revit.

20 KV Distribution System Modeling and Study in CYME (For private client in 2020)

Having information about a Power System in Excel worksheets created manually by the client, I managed to figure out the relation of the CYME Database and then created a code to format and convert their data into the CYME Database without manually modeling the system.

Power System Dynamics: AVR, Governor, and PSS Design for a Generator using SIMULINK MATLAB

The traditional generator is modeled in detail in MATLAB Simulink. A test scenario of a short circuit fault is designed to test the Generator. Then using MATLAB SISO Tool AVR, Governor, and PSS controllers are designed to control the Generator power voltage and improve the stability of the power system.

Full Microgrid Modeling: DC and AC, primary, secondary, and tertiary control design using SIMUULINK MATLAB (Course project in 2019)

Two Microgrids, One AC and one DC are created. Several severe transient and power quality phenomena are implemented as scenarios (Model resiliency test). First Buck and Boost inverters to convert DC to AC with L and LCL filters are designed. Then PID and PR controllers are designed using the SISO tool and PID tuner for the inverters. Then these inverters relate to several loads and phenomena are tested. Finally, a tertiary control (System Level) is designed to coordinate and stabilize the inverters in the Islanded Microgrid.