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Fault Location in Active Distribution Grids

Project type:	☐ Semester project	☒ MSc thesis	☐ Internship
Project responsible (email):	mayank.nagendran@zaphiro.ch		

Project description and objectives:

Fault location algorithms need to consider the contributions to the fault current due to the presence of Distributed Generation (DG) in modern networks.
The objective of the project is twofold
- expand the *differential-based* fault locator algorithm to correctly identify the faulted area when the DGs are not monitored
- improve the *fault distance* computation algorithm to account for DGs contribution, when directly measured by PMUs.

Tasks:

- Understand the shortcomings of the current fault location approach and prepare a short report on available multi-end fault location with an emphasis on distribution grids
- Adapt/develop a method to address the presence of distributed generation using measurements from multiple PMUs
- Validate the new fault distance computation using simulated and real-world (if possible) examples

Required skills:

- Strong understanding of distribution grids, especially fault analysis
- Knowledge of Matlab/Python to implement the fault location methods
- Working knowledge of power system simulation using Power Factory/EMTP is an advantage - if not test cases can be provided by Zaphiro

Other benefits and/or compensation:

Depending on the final project type, scope and deliverables, Zaphiro may consider providing additional adequate compensation.

About Zaphiro:

Zaphiro is an innovative smart grid company based in Lausanne, Switzerland, and Milan, Italy, that was founded in 2017 as a spin-off from EPFL and is backed by well renowned international groups such as ABB and CDP Ventures.
Our product, SynchroGuard, is the first distribution grid monitoring & automation system based on D-PMU (Distribution-Phasor Measurement Unit) technology, specifically designed to easily retrofit distribution substations and integrate with existing control room solutions (e.g., SCADA, DMS). SynchroGuard helps utilities increase grid observability, particularly in presence of high DER penetration, and improve grid resiliency by reducing the impact of blackouts on their consumers.