

Student project proposal

Project title

Fault Location in Active Distribution Grids

Project type MSc thesis BA semester project MSc semester project

Project responsible and e-mail

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Project description

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 of the student

- 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.

Requirements

- 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.

Literature

- [1] "IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines," in IEEE Std C37.114-2014 (Revision of IEEE Std C37.114-2004) , vol., no., pp.1-76, 30 Jan. 2015.
- [2] M. M. Saha, J J Izykowski, and E Rosolowski, "Fault location on power networks," Springer Science & Business Media, 2009
- [3] Jun Zhu, D. L. Lubkeman and A. A. Girgis, "Automated fault location and diagnosis on electric power distribution feeders," in IEEE Transactions on Power Delivery, vol. 12, no. 2, pp. 801-809, April 1997