École Polytechnique Fédérale de Lausanne
Distributed Electrical Systems Laboratory
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Student project proposal

Development of an FPGA-based PMU for Power Grid Monitoring

Project type ☐ MSc thesis   ☐ BA semester project   ☒ MSc semester project

Project responsible and e-mail
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Project description
The estimation of the grid state is critical to monitoring, protection and control applications such as state estimation and fault location. Phasor Measurement Units (PMUs) are ideal for this purpose and can perform fast, accurate and synchronized analysis of voltage and current waveforms.

The **objective** of this project is to develop a flexible, efficient and user-friendly PMU on a National Instruments compactRIO platform with the following considerations:
1. Flexible design for easy modification of signal analysis parameters.
2. Limited latency, computational complexity and memory.
3. An accessible interface allowing users to configure parameters, monitor results, and retrieve and log data efficiently.

Learning objectives:
The student will gain an understanding of signal processing algorithms (advanced interpolated DFT methods), data flow and synchronization in FPGA-based platforms, programming of embedded devices and power grid monitoring applications, all while creating a adaptable PMU for use in various DESL projects.

Requirements
- Good LabVIEW programming knowledge
- PMU fundamentals