Karlsruhe Institute of Technology

Institute for Automation and Applied Informatics (IAI)

ENERGY LAB

HITACHI

Bachelor Thesis

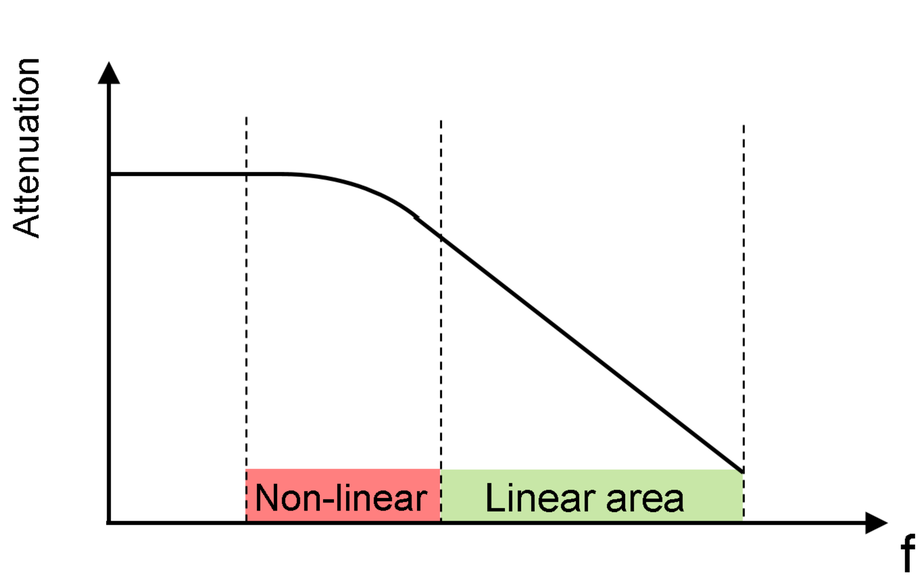
Analysis of current sensor technologies for low voltage distribution networks

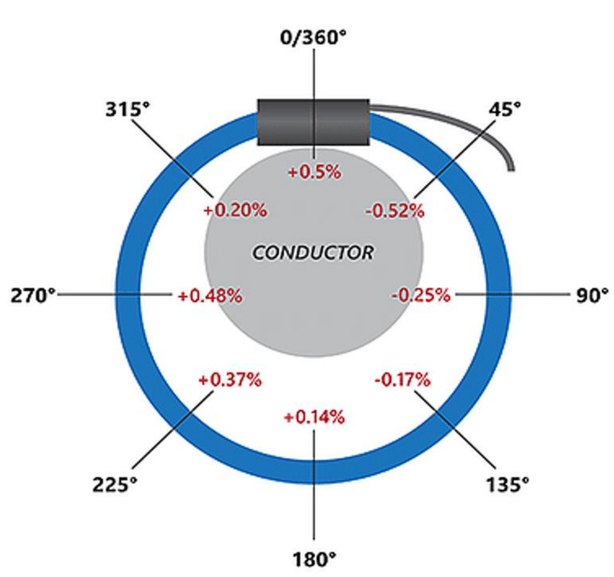
Background

Smart grids use current sensors in different types, formats and functions to collect data for control and monitoring purposes. These include Rogowski sensors, low power current transformers (LPCT), classical transducers etc. They have different working principles, measurement characteristics and electrical properties, which must be considered when choosing the sensor for a specific use case.

Scope of work

Within the scope of this work, sensors of different types and classes are to be investigated in experimental scenarios at the Energy Lab of KIT. The target is to test and analyze previously selected sensors with regard to linearity, sensitivity, accuracy and reliability. Finally, an assessment is to be made which sensors are suitable for which application. Further, the thesis should address possible measures to expand the field of application for certain sensor types.





The work takes place in close cooperation with the Distribution Automation (DA Solution) department of Hitachi Energy in Mannheim and provides an insight into the professional environment of product development.

Preliminary outline of the work

1. Literature and market research (focus: Types, characteristics, models, applications for current sensors in low and medium voltage grids)
2. Creation of a measurement concept for the experimental investigation of selected properties for a set of provided sensors
3. Conduction of several series of measurements with different sensors
4. Processing and evaluation and analysis of the experimental data
5. Suggestions for improving the previously analyzed behavior of the sensors and the data processing

Most of the work is carried out in the Energy Lab (Campus North of KIT). In addition, two phases of one week each must be planned in the laboratory of Hitachi Energy in Mannheim.

This sounds exciting? Then get in touch!

Die Arbeit darf natürlich auch in deutscher Sprache geschrieben werden.

Contact

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System, Framework

- Experimental facilities at KIT Campus North (Energy Lab)

Studies

- Electrical engineering or similar disciplines

Required skills

- Hands-on experience with laboratory equipment (e.g. as part of your study, trainings or hobby)
- Programming (python/matlab) and office tools for data analysis and evaluation

Preferred and helpful skills

- Knowledge of measurement systems, data acquisition, monitoring and control in power systems (aka. Smart Grid concepts)
- Knowledge in either energy, metrology or high frequency engineering

Languages

German, English

Starting date

As soon as possible.

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