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Estimation of net-impedance passively by perturbations from loads, with application to network fault detection by smart meters

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Background

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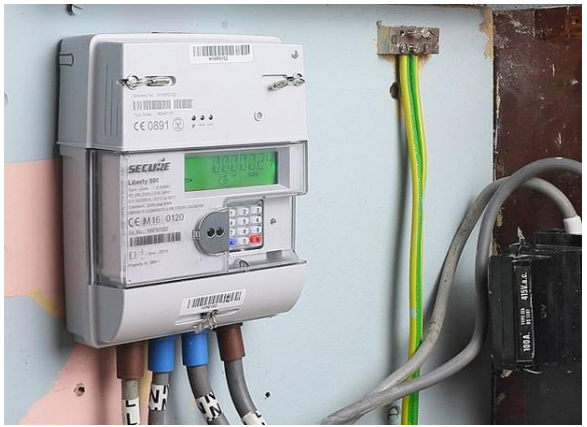
The application of smart meters has greatly improved the observability of the grid, especially for **the detection of grid faults.**



Active estimation & **Passive estimation**

- Active estimation:
  - \+ easier to get high accuracy
  - – need extra hardware
- Passive estimation:
  - \+ no extra hardware
  - – more susceptible to other changes

Approach

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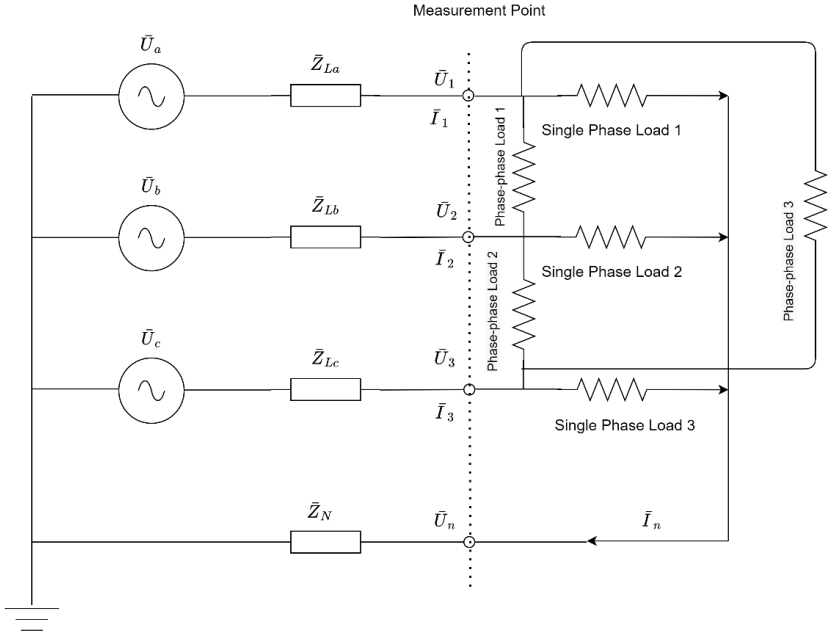
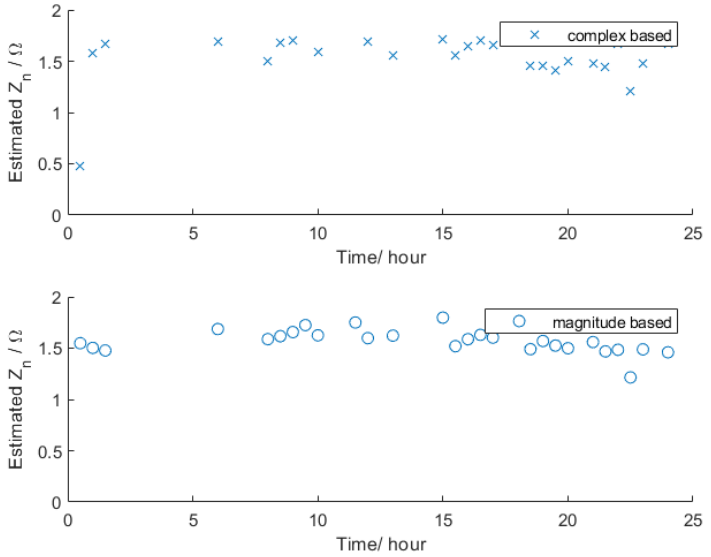
Loop theory method



Estimation Result



Approach

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To improve current loop theory method

- Analyze recorded 16kHz data from several LV networks
  - Study the reason of noise measurement
  - Find suitable data processing method
- Various load simulation
  - Determine complicated load system voltage and current variation
  - Better method to compare the value before and after a change

Expected Result

A guideline for best thresholds and data processing method to accurate the estimation result.

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Thank you!