

## SSCI Portfolio

Vulnerabilities of Power grid due to line failures based on Power  
traffic centrality of the line Graph

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## Why is this research topic important?

- ▶ Energy systems are mainly large fragile structures.
- ▶ Failures are unwanted but unavoidable
- ▶ Effect of loosing the energy supply is critical



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1. Motivation
2. Related Work
3. Memory Refreshment
4. Results
5. Conclusion



### What has been done so far?

- ▶ T. Verma et al. - "Context-Independent Centrality Measures Underestimate the Vulnerability of Power Grids"
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## Review on Graph Modeling for power networks

- ▶ Weighted graph based on power traffic

- ▶ Weighted Line Graph theory

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## Review on Graph Modeling for power networks

- ▶ Consists mainly of papers presented by:
  - ▶ P. Chopade et al.<sup>1</sup>
  - ▶ T. Yoshida et al.<sup>2</sup>

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<sup>1</sup>P. Chopade and M. Bikdash, "New centrality measures for assessing smart grid vulnerabilities and predicting brownouts and blackouts"

<sup>2</sup>T. Yoshida, "Weighted line graphs for overlapping community discovery"

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## What was developed?

- ▶ Series of Monte Carlo simulations were developed
- ▶ Standard IEEE 30, 57, 118 and 300 buses test cases
  - ▶ Data from R. D. Zimmerman et al. in Matpower v5.1
  - ▶ Matlab implementation from O. T. Daniel et al., Yogesh S. Kale et al. and Norbert A. Agana et al.

It was noted..

- ▶ .. that after 200 scenarios, there was not a considerable variation (less than 6%)

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- ▶ It is expected as more nodes are contributing to the sum of centralities the more fragile the grid is
- ▶ Authors want to find the most appropriate centrality measure for this case in the future

## 5 (Poor)

- ▶ Huge number of typos, grammar mistakes and formatting mistakes
- ▶ The results are poorly described and explained
- ▶ Nearly all work done is made by "Captain obvious" or previous publications

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