
SEMINARIO

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Topology and parameter estimation for an electrical network based on algebraic variety learning and graph sparsification

Abstract: Electric power systems are going through significant changes. On one side, they are in rapid expansion, which makes it hard for system operators to know the crucial information of its topology and cable parameters. On the other side, there is an improvement on the quality and quantity of available power and voltage measurements on them that can be used to estimate this information. We propose two algorithms that work with power and voltage measurements as input. The first one estimates the cable parameters of a DC or a balanced AC electrical network from a known topology using techniques of numerical algebraic geometry. The second one estimates simultaneously the topology and data cable of any DC network, or an AC low-voltage distribution network whose line inductances are significantly smaller in magnitude than line resistances, combining the first algorithm with techniques of spectral graph theory, in a iterative procedure inspired by machine learning.

Both algorithms are tested on several electrical networks.

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