

Synchrony, aggregation, and multi-area eigenanalysis

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Abstract-

This paper explores synchrony, a generalization of the concept of slow-coherency, and outlines how it can form the basis for efficient construction of dynamic equivalents by aggregation. The paper describes a novel approach for selecting the inter-area modes that are to be represented by the aggregate model. A clustering algorithm for recognizing approximate synchrony is presented, and improvements over the standard slow-coherency recognition algorithm are noted. Using for illustration a 23-generator power system model with 325 state variables, the paper demonstrates the effectiveness of a synchrony-based approach to decomposing the eigenanalysis of the electromechanical modes, separating the computation of inter-area and intra-area modes in the style of multi-area selective modal analysis.

Index Terms-

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