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Selective modal analysis with applications to electric power systems, Part II: the dynamic stability problem

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Abstract— Selective Modal Analysis (or SMA) is a physically motivated framework for understanding, simplifying and analyzing complicated linear time-invariant (or LTI) models of dynamic systems [1,2,3]. SMA allows one to focus on any prespecified dynamic pattern of intrest in the model. In particular, One can efficiently and accurately compute the eigene values and eigenvectors of the natural modes of interest and their sensitivities, and also determine physically meaningful reduced order models containing these natural modes. SMA is particularly suitable for dealing with composite models, i.e. models consisting of several dynamic subsystems interrelated by static constraints. An introduction to the basic concepts of SMA pertinent to the applications being considered here is presented in the companion paper [3]. This paper concerns the application of SMA to the Dynamic Stability problem in electric power systems; it is shown how SMA is well suited to meet the demanding requirements of Dynamic Stability analysis. This is illustrated in [3] with examples, including a 60-machine model of a dynamic instability occurrence in an actual power system.

Index Terms—

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