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Selective modal analysis of power system oscillatory instability

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Abstract-

The dimensionality problems posed by the analysis of the oscillatory stability of large power systems remains an open issue. An extension to the original selective modal analysis (SMA) approach that has been inspired by the oscillatory stability problem is presented. SMA is a physically motivated framework for understanding, simplifying and analyzing complicated linear time-invariant models of dynamic systems. The proposed method avoids dealing with the large system matrix and shows significant reductions in storage and computation requirements as compared to straight eigenanalysis. It can also exploit a priori knowledge on the potential instability case to be studied. This reduced-order eigenanalysis approach has been checked for examples of realistic size and can be used as a basis for an efficient production-grade code for analysis of oscillatory stability in large power systems

Index Terms-

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