

This paper presents a modified method for power system transient stability analysis, allowing the reduction of the computational requirements while retaining important system dynamics. The approach formulates the power balance equations depending on the area of interest. The detailed ac model, including full real and reactive power equations, is used for the area in which high accuracy is required, while the simpler dc model, including linear real power equation, is used for more remote areas where real power dynamics dominate. A high level of accuracy can be achieved using the ac model in the area of interest, and computational complexity can be reduced with the less detailed dc model in the remainder of the system. In order to prevent the loss of simulation accuracy, this paper proposes a way to compensate line losses neglected using the dc model. Case studies with the IEEE 118-bus system are provided to validate the performance of the proposed method.