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Transient Stability Analysis On IEEE-9 Bus System Under Multiple Contingencies

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Abstract: *Transient stability analysis is essential in power system studies to ensure the secure and reliable operation of interconnected systems, especially during disturbances like faults or sudden changes in load or generation. This study investigates the transient stability of the IEEE 9-bus system under multiple contingencies. The IEEE 9-bus system, a simplified representation of a typical power network, is widely used for transient stability studies due to its balanced topology and complexity. In this work, various fault scenarios are simulated to assess the system's response to disturbances and the effectiveness of system recovery measures.*

In this research, various fault scenarios, including three-phase faults and line outages, are introduced to observe system responses and analyze critical parameters such as rotor angle stability, frequency deviations, voltage profiles, and fault clearing times. Key metrics are evaluated to determine the system's ability to regain stability after disturbances, with attention to how factors like fault duration, system damping, and control actions impact recovery. This study also examines the effectiveness of different protection and control mechanisms in maintaining stability.

Keywords: IEEE 9- bus system, Fault Scenarios,

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