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国家重点基础研究项目

局部弱联诱发互联电网强迫振荡机制分析

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摘要： 本文应用扩展的多自由度强迫振动理论和特征值分析方法，研究局部弱联诱发互联电网发生区域强迫振荡的机理。针对中国电力网络现阶段互联的特点，指出弱阻尼局部振荡是系统稳定运行的潜在威胁。对此重点分析了电力系统多机强迫振荡与系统固有振荡频率、机组相关因子的关系，提出如果扰动源振荡频率接近区间振荡模式，局部振荡机组满足与区间振荡模式相关性较强等条件，就会诱发系统发生区域强迫低频振荡。最后根据WAMS记录的数据，应用该机理分析了华中电网的两次强迫低频振荡事故，分析结果验证了该机理的合理性和正确性。

关键词：

Analysis on Mechanism of Inter-Area Forced Oscillation Caused by Local Weak Interconnection in Interconnected Power Grid

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Abstract: By use of the theory of multiple-degree-of- freedom (MDOF) systems and eigenvalue analysis, the mechanism of inter-area forced oscillation in interconnected power grid brought out by local weak interconnection is researched. According to current features of power gird interconnection in China, it is pointed out that the underdamped local oscillation is the potential menace to system stable operation. The relation between multi-machine forced oscillation and system natural oscillation frequency and that between multi-machine forced oscillation and correction factors of generation units are emphatically anlayzed. It is proposed that if following conditions are satisfied, i.e., the oscillation frequency of perturbance source is close to that of inter-area oscillation mode and there is strong correlativity between locally oscillated units and inter-area oscillation mode, the inter-area forced low frequency oscillation will be caused to happen. Finally, based on the data recorded by wide area measurement system (WAMS), two forced low-frequency oscillation faults in Central China Power Grid are analysed using the proposed mechanism, and analysis results show that the proposed mechanism is rational and correct.

Keywords:

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