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电力系统

含负荷模型的次同步谐振分析

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摘要:

首先推导了同步电机dq坐标系下的5阶感应电动机动态方程，此方程能够与含电磁暂态的次同步谐振分析的同步电机及网络方程接口。同时分别推导了5阶感应电动机及恒阻抗(Z)、恒电流(I)、恒功率(P)等负荷模型线性化方程。应用IEEE第一标准模型建立了包含上述负荷的次同步谐振分析的线性化模型，分析了ZIP等静态负荷以及感应电动机与恒阻抗构成的综合负荷对扭振模态阻尼特性的影响。分析结果表明，上述不同负荷模型导致了不同的扭振模态失稳，不考虑负荷模型的分析结果可能过于乐观，也不能找到一种负荷模型确保分析结果保守。

关键词:

Analysis of Subsynchronous Resonance Containing Load Models

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Abstract:

In this paper, a set of five-order dynamic equations of induction motor in d-q coordinates of synchronous generator, which can be interfaced with network equations and generator equations, is derived, meanwhile the five-order linearized equations of induction motor as well as the equations of load models containing constant impedance, constant current and constant power are derived too. Utilizing the IEEE first benchmark model, the linearized models containing above-mentioned loads for analysis on subsynchronous resonance (SSR) is established. The influences of above-mentioned static load models and synthetic load model consisting of induction motor and constant impedance on damping characteristics of torsional modes are analyzed. Analysis results show that above-mentioned different load models leads to instability of different damping characteristics of torsional modes, and the analysis results may be over optimistic without regards to load models, and it is impossible to ensure the analysis results always conservative by means of a kind of load model.

Keywords:

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