

电力系统

基于Karush-Kuhn-Tucker最优条件的电网可疑参数辨识与估计

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摘要:

电网元件参数的误差会导致能量管理系统的状态估计结果不准确, 从而影响其他应用结果的可靠性和精确性, 因此状态估计程序应当具有辨识和估计元件参数的功能。首先基于拉格朗日乘子的可疑支路辨识法, 提出了一种迭代辨识算法, 用于生成待修正的支路参数集; 然后研究了基于参数 - 目标函数灵敏度的参数估计方法, 该方法针对选出的可疑支路, 计算出可疑支路参数对状态估计目标函数的灵敏度; 最后利用变步长逐次逼近法估计可疑支路参数, 该方法避免了传统方法的数值稳定性问题, 具有很高的实用价值。IEEE 14和IEEE 30标准算例系统验证了所提出方法的正确性。

关键词:

A Method to Identify and Estimate Network Parameter Errors Based on Karush-Kuhn-Tucker Condition

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Abstract:

Network parameter errors may strongly deteriorate the accuracy of state estimation results and affect both reliability and accuracy of other applications, thus state estimation program should possess the function to recognize and estimate element parameters. In this paper, firstly, based on Lagrangian algorithm an iterative method to identify incorrect parameters is proposed to generate branch parameter set to be modified; then a parameter estimation method based on the sensitivity of parameter to objective function, which represents how the parameters affect the quality of the state estimation solution, is researched, and for the chosen distrustful branch this method calculate the sensitivity of parameters of distrustful branch to objective function of state estimation; finally, the variable step-size successive approximation method is used to estimate the parameters of distrustful branch. This method eschews the numerical stability in traditional methods, so it is practicable. The results of IEEE 14-bus system and IEEE 30-bus systems show that the proposed method is corrective.

Keywords:

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