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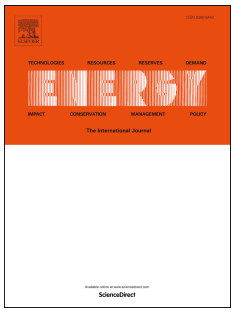

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Sisi Guo, Pei Liu, Zheng Li

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Enhancement of performance monitoring of a coal-fired power plant via dynamic data reconciliation

Sisi Guo[a], Pei Liu[a,*], Zheng Li[a]

[a]State Key Lab of Power Systems, Department of Thermal Engineering, Tsinghua University, Beijing, China 100084

* Corresponding author. Email: liu_pei@tsinghua.edu.cn; Tel+86 10 62795734x333; Fax. +86 10 62795736

Abstract

Wide-range and frequent operation changes have become a common phenomenon with thermal power plants in the context of fast penetration of intermittent renewable power. Performance monitoring at transient states is more important to the safety and high efficiency of power plants. Data quality is essential for conducting dynamic performance monitoring, and dynamic data reconciliation (DDR) provides great potential to enhance quality of measured data at transient states. In this paper, a moving window based approach to dynamic data reconciliation is proposed for a real coal-fired power plant using high sampling operational data. Firstly, dynamic characteristics of the system are discussed, taking account of the equipment accumulation in DDR problems. Results of case studies indicate that the data accuracy of measured mass flow parameters are enhanced effectively after DDR, and better results are obtained with the increasing time window size. Comparison with steady state data reconciliation approach is also carried out to indicate the enhanced effect of the DDR approach for the performance monitoring of a real power plant.

Key words: Dynamic data reconciliation; Steam turbine power plant; Performance monitoring; Moving window; Dynamic characteristics;

1. Introduction

Recently, the development of renewable energy and renewable power generation are rapid in the world. Lacking of the practical large-scale electricity storage, the traditional power plant has to compensate the power demand[1], and the proportion of peaking power capacity for base load power plants is increasing continuously.