Data processing of thermal power plants based on dynamic data reconciliation

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Abstract

Performance monitoring of power plants at dynamic states is more significant for efficient operation due to wide-range and frequent operation changes in China. Data reconciliation is widely used in industry for improving the quality of measured data for better effect of modelling and performance monitoring. Most previous studies in power plants focus on steady state data reconciliation methods, while dynamic data reconciliation is necessary in real power plants since dynamic effects cannot be negligible. Due to the system complexity and defect of measurement instruments, research on dynamic data reconciliation in power plants is insufficient. In this work, we investigate the dynamic characteristics of the system considering equipment accumulation, and study the dynamic data reconciliation approach using simulation models for key equipment in thermal power plants. Case studies are constructed to analyse the effect of different sampling rates of data, initial values of data, and parameters in the algorithm on the results of dynamic data reconciliation separately. Results indicate that it is better to choose high sampling rates for measured data in a dynamic data reconciliation problem for better accuracy of reconciled results, and an optimized time window length can be selected for a fixed problem according to the required accuracy as well as computation complexity.