

热能工程

采用M5'模型树和测量数据识别抽汽式机组汽耗量特性

章坚民<sup>1</sup>,刘登涛<sup>1</sup>,吴光中<sup>2</sup>,张云雷<sup>3</sup>

- 1. 杭州电子科技大学
- 2. 浙江省经济与信息化委员会
- 3. 浙江省电力公司

摘要:

汽轮机组特性随着机组老化而变化, 传统上采用定期现场实测, 需停机和采用专门的设备与系统, 费用很高, 因此基于现有自动化系统历史测量数据的特性曲线识别方法十分必要。一般汽轮机组汽耗量特性具有非凸和非连续等特点, 常规的多元线性回归拟合不能适应。M5'模型树算法是一种多输入单输出系统的分段线性化的数据挖掘算法。提出采用M5'模型树的抽汽式机组汽耗量特性模型和其模型结构及参数识别算法, 用于滚动利用最新的电厂测量历史数据获取最新的汽耗量特性。该方法简单、有效, 逼近能力强, 自动化程度高, 在处理非凸形和非连续性的特性方程具有优势。通过多个热电厂的实时数据进行验证, 具有很高的预测精度, 效果优于多元线性回归拟合方程。

关键词: 抽汽式机组 汽耗量特性 M5'模型树 非凸性函数 非连续性函数 多元线性回归模型

Working Condition Characteristics Identification for Extraction Unit By Using M5' Model Tree and Measured Data

ZHANG Jianmin<sup>1</sup>, LIU Dengtao<sup>1</sup>, WU Guangzhong<sup>2</sup>, ZHANG Yunlei<sup>3</sup>

- 1. Hangzhou Dianzi University
- 2. Zhejiang Economic and Information Technology Commission
- 3. Zhejiang Electric Power Corporation

Abstract:

The working condition characteristics of steam turbine unit will be changed due to aging, so routine shut down test in regular intervals is adopted with special equipment and system in costly expense, therefore, the characteristics identification method using the historical measurement records of existed automation and information system becomes necessary. The steam turbine characteristics normally has the property of non-convex and non-continuity, and multivariate linear regression model is not able to deal with. M5' model tree, a data mining method, is good for segmental linearization of single-output multi-output system, was introduced to model the working condition characteristics of extraction unit and to identify the model structure and its parameters. Such model identification method can be used to achieve the latest characteristics by a scroll way using latest measurement data, which can replace the traditional regular characteristics test. Such method has advantages of effective and efficient in implementation, good in approximation, and special property on processing of non-convex and non-continuous function of unit characteristics, and was approved by many CHP stations which shows its good performance and better than the general practiced multi-variables linear model.

Keywords: extraction unit working condition characteristics M5' model tree non-convex function non-continuous function multivariate linear regression model (MLR)

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通讯作者: 章坚民

作者简介:

作者Email: zhangjm@tom.com

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