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农村水电站电能生产动态不确定性优化调度模型

Rural hydropower electricity production optimal scheduling model under dynamic uncertain environment

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中文关键词: 优化控制系统 不确定分析 预测控制系统 电能生产 农村水电站

英文关键词:optimal control system uncertain analysis predictive control system electricity production rural hydropower stations

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中文摘要:

农村水电站由于存在模糊动力特性、瞬时给定负荷和不确定检修计划等动态不确定因素，故不能采用确定环境下的全局优化调度模型，针对该问题构架了基于网络控制系统的动态不确定优化调度模型，该模型由环境预测数据库、滚动时窗、时窗优化模件、时窗驱动器、反馈校正器等组成。结合农村水电站电能生产的具体过程对该模型进行软件编制，构建了基于I/O调度触发器的环境预测数据库，设计了混合确定与不确定约束的滚动时窗，研制了按周期滚动优化的时窗优化模件，开发了由定时器和事件驱动器组成的时窗驱动器，形成了具有不确定因素补偿功能的反馈校正器。优化调度运行与实际仅凭经验运行的对比结果表明，该模型可以有效地解决农村水电站电能生产的动态不确定问题，明显地提高了水电站的发电效益

英文摘要:

With the consideration of some uncertain factors such as fuzzy dynamic characteristics, instantaneous load and uncertainty maintenance scheduling, etc, an optimal scheduling program model cannot be adopted in such uncertain circumstance. A networking-management based on dynamic uncertainty optimal scheduling model was designed. This model was composed of environment prediction database, scrolling time windows, time window optimization modules, time windows drivers, and feedback correction. In accordance with the actual power generating process in rural hydropower station, this model was optimized as following, firstly, I/O scheduler triggers based on environment prediction database was designed; secondly, a hybrid certainty and uncertainty limited scrolling time window was developed; thirdly, a time window driver was set up which consists of timer and event driver and finally uncertain factor compensatory functional feedback compensator was launched. The comparison result of optimized operation and experience based on operation showed that this mode can solve the uncertainty issues in power generating process in rural hydropower stations and improve the efficiency in power generating effectively.

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