

反应堆工程

## 核动力设备优化设计研究

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**摘要** 降低核动力装置的重量可提高动力装置的综合性能, 这也是评价核动力装置技术水平的一重要指标。蒸汽发生器和稳压器是核动力装置中的重要设备, 本文以两个设备重量之和最小为目标, 采用改进复合形优化方法对其进行优化设计。结果显示: 与母型相比, 优化设计方案的总重量减小了20.4%, 优化效果显著。同时比较了设备耦合优化与单设备优化的差异, 分析了设备重量受运行参数影响的敏感性, 为工程设计提供参考。

关键词 [优化设计](#) [设备耦合](#) [蒸汽发生器](#) [稳压器](#) [敏感性分析](#)

分类号

## Research on Design Optimization of Nuclear Power Components

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**Abstract** The overall performance of nuclear power plant can be improved by decreasing self weight, which is one of the most important guidelines for the evaluation of design rationality of the nuclear power plant. Steam generator and pressurizer are important components in nuclear power plant. Therefore, the research focused on the method of minimizing the total weight of these two components. The design optimization of the total weight was carried out by self-developed codes based on complex algorithm. The results show that the optimized weight is 20.4% less than original, and it means that the optimization effect is obvious. The paper compares the difference of optimization results between coupled-devices and single component. The effects of operation parameters on the component weight were also analyzed in order to provide reference for engineering design.

**Key words** [optimal design](#) [coupled-devices](#) [steam generator](#) [pressurizer](#) [sensitivity analysis](#)

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