

工程与应用

## 交叉冗余体系结构的安全性分析

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**摘要** 为确保列车运行安全和提高运输效率, 迫切需要装备性能先进、安全可靠的信号系统。给出一种利用马尔可夫模型分析信号系统安全性的方法, 根据系统特性及系统各部分间的独立性, 将系统各部分的失效率划分为几个独立不相关的分量, 充分考虑到各部分失效率对系统安全性的影响, 利用系统分解和模型压缩的方法解决状态空间的激增问题, 并对铁路信号系统中使用的交叉冗余体系结构进行了安全性定量分析和仿真。

**关键词** [交叉冗余体系结构](#) [马尔可夫模型](#) [安全性](#)

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## Safety analysis of cross-redundant architecture

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### Abstract

It's an urgent demand of equipping advanced, safe and reliable train control system because of demand on railway signaling system in safety and transportation efficiency. Now a method for analyzing the safety of railway signaling system by Markov model is provided. Based on the feature and the independent of sub-system of signaling system, the failure rates of sub-system are divided into several different parts. The safety can be analyzed according to the effects of each part of the failure rate; system decomposition and model compression are used to solve the problem of state proliferation. Finally, using the method to realize the quantity analysis and simulation about signaling system safety, which architecture is cross-redundant.

**Key words** [cross-redundant architecture](#) [Markov model](#) [safety](#)

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