# 基于逻辑"或"约束优化的实时系统设计

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## Abstract

The logic relationship among the equality and inequality constraints in a standard constrained optimization problem (SCOP) is the logical AND. Various efficient, convergent and robust algorithms have been developed for such a SCOP. However, a more general constrained optimization problem (GCOP) with not only logic AND but also OR relationships exists in many practical applications. In order to solve such a generalized problem, a new mathematical transformations which can transfer a set of inequalities with logic OR into inequalities with logic AND relationships is developed. This transformation provides a necessary and sufficient condition which enables us to formulate real-time system design as a mixed Boolean-integer programming problem. A Branch and Bound Algorithm is applied to find the optimal solution. Experimental results have been presented to show its merits.

## 摘要

标准约束优化问题的等式或不等式约束之间是逻辑"与"关系,目前已经有很多高效、收敛的优化算法.但是,在实际应用中有很多更一般的约束优化问题,其等式或不等式约束之间不仅包含逻辑"与"关系,而且还包含逻辑"或"关系,现有的针对标准约束优化问题的各种算法不再适用.给出一种新的数学变换方法,把具有逻辑"或"关系的不等式约束转换为一组具有逻辑"与"关系的不等式,并应用到实时单调速率调度算法的可调度性判定

充要条件中,把实时系统设计表示成混合布尔型整数规划问题,利用经典的分支定界法求解.实验部分指出了各种方法的优缺点.

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