

协同设计中基于解空间的约束求解技术

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摘要: 针对协同设计中约束求解算法的不足, 提出了一种基于约束二叉树进行区间收缩的算法, 主要包含从二叉树的叶子到根部的区间正向扩展运算和从二叉树的根部到叶子的区间反向收缩运算的两个过程。基于此算法, 开发了约束求解器, 对约束进行求解以获得多设计领域约束的公共解区间。这种方法避免了引入中间变量和对约束进行解函数分解, 提高了求解效率, 并易于实现符号计算的自动化。 Aiming at the shortages of constraints solving in collaborative design, an interval narrowing algorithm based on constraint bintree was put forward, in which two processes were included, namely the forward interval expanding operation from bottom to root of constraint bintree and the backward interval shrinking operation from root to bottom of constraint bintree. Then a constraint solver has been developed to solve the public solution space of the multi-disciplinary constraints. Using this method can avoid introducing the internal variables and decomposing the constraints into solution functions, improve solving efficiency and easily implement symbol calculation automation.

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