航空学报
ACTA AERONAUTICA ET ASTRONAUTICA SINICA
ISSN 1000-6893
CN 11-1929/V

航空学报 » 1997, Vol. 18 » Issue (3) :348-350 DOI:

分布存储结构并行处理机上隐式有限差分算法并行尝试

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A PARALLEL TRY FOR IMPLICIT FINITE DIFFERENCE ALGORITHM ON DISTRIBUTED MEMORY SYSTEMS

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摘要

通过对传统的Beam-Warming隐式格式的并行化尝试，实现了无粘和粘性空气动力学方程的并行求解。计算中采用了SPMD并行编程模式，并将静态非重叠网格区域分裂技术用于建立计算区域和并行处理系统处理器节点之间的映射。结果表明原等价串行算法的稳定性和收敛性被基本保留，获得的加速比和并行效率较为满意。

关键词： 并行计算 有限差分 空气动力学

Abstract:

Viscous/inviscid aerodynamics equations are solved through a parallel try for the classical Beam Warming implicit solver. The program mode SPMD is selected, and a static non overlapped decomposition method is used to establish the projection between the computation domain and the processing nodes of parallel systems. The results show that the stability and convergence of the original serial algorithm is maintained and that the speed up and efficiency are satisfactory.

Keywords: sparallel computation finite difference aerodynamics

Received 1996-08-06; published 1997-06-25

引用本文:

王强;马汉东;汪翼云. 分布存储结构并行处理机上隐式有限差分算法并行尝试[J]. 航空学报, 1997, 18(3): 348-350.DOI:

Wang Qiang; Ma Handong; Wang Yiyun. A PARALLEL TRY FOR IMPLICIT FINITE DIFFERENCE ALGORITHM ON DISTRIBUTED MEMORY SYSTEMS[J]. Acta Aeronautica et Astronautica Sinica, 1997, 18(3): 348-350.DOI:

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