Domain Decomposition of the Fourth-Order AGE Method on Heat Equation with MPI

Abstract

A parallel implementation of the fourth-order Alternating Group Explicit (AGE-4) method on 1-D heat equation on a distributed computing environment through Message Passing Interface (MPI) is reported. The numerical method is implicit and is based on a splitting strategy which is applied alternately at each half time step. The parallelization of the program is implemented by
a domain decomposition strategy on MIMD parallel architectures using MPI platform. The parallelization strategy and performance are discussed. It is concluded that the efficiency is strongly dependent on the grid size, block numbers and the number of processors. Different strategies to improve the computational efficiency are proposed.

Reference


Index Terms

Computer Science
Distributed Computing

Key words

Heat Equation
AGE-4
MPI

Domain Decomposition