Parallel implementation of fourth order block backward differentiation formulas for solving system of stiff ordinary differential equations

ABSTRACT

Parallel implementation of fourth order Block Backward Differentiation Formulas (BBDF(4)) is presented for a numerical solution of first order stiff ordinary differential equations (ODEs). This method computes the numerical solution at two points concurrently in each block. The sequential and parallel codes are developed on Message Passing Interface (MPI) library and run on High Performance Computing (HPC). The performance of this new method is measured in terms of Speedup (Sp) and Efficiency (Ef). It is shown that the parallel implementation BBDF(4) produced a better speed up compared to the sequential timing.

Keyword: Block backward differentiation formula; Parallel; Stiff