

An efficient solver for solving chemical kinetic equations using higher order block backward differentiation formula

ABSTRACT

In this paper, an efficient solver known as higher order block backward differentiation formula (HOBBDF) is applied to chemical kinetic equations. In order to prove the applicability of this higher order solver, the chemical kinetic ordinary differential equations (ODEs) are numerically tested. Then, a comparison of performance between HOBBDF and two ODE solvers in MATLAB, particularly ode15s and ode23, are made. Evidently, it is proven that HOBBDF method outperforms ODE solvers in terms of accuracy. Therefore, HOBBDF method can also be applied to solve chemical kinetic equations.

Keyword: Block backward differentiation formulae; Initial value problem; Stiff ordinary differential equations; Chemical kinetic equations