

Numerical solution of differential algebraic equations (DAEs) by mix-multistep method

ABSTRACT

Differential Algebraic Equations (DAEs) are regarded as stiff Ordinary Differential Equations (ODEs). Therefore they are solved using implicit method such as Backward Differentiation Formula (BDF) type of methods which require the use of Newton iteration which need much computational effort. However, not all of the ODEs in DAE system are stiff. In this paper, we describe a new technique for solving DAE, where the ODEs are treated as non-stiff at the start of the integration and putting the non-stiff ODEs into stiff subsystem should instability occurs. Adams type of method is used to solve the non-stiff part and BDF method for solving the stiff part. This strategy is shown to be competitive in terms of computational effort and accuracy. Numerical experiments are presented to validate its efficiency.

Keyword: Differential algebraic equations; Partitioning