Development of Variable Order Block Multistep Method for Solving Ordinary Differential Equations

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Abstract : In this paper, a class of variable order fully implicit multistep Block Backward Differentiation Formulas (VOBBDF) using uniform step size for the numerical solution of stiff ordinary differential equations (ODEs) is developed. The code will combine three multistep block methods of order four, five and six. The order selection is based on approximation of the local errors with specific tolerance. These methods are constructed to produce two approximate solutions simultaneously at each iteration in order to further increase the efficiency. The proposed VOBBDF is validated through numerical results on some standard problems found in the literature and comparisons are made with single order Block Backward Differentiation Formula (BBDF). Numerical results shows the advantage of using VOBBDF for solving ODEs.

Keywords : block backward differentiation formulas, uniform step size, ordinary differential equations

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