A scheme for the implementation of implicit Runge-Kutta methods

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Abstract

The computational work required to implement implicit Runge-Kutta methods is often dominated by the cost of solving large sets of nonlinear equations. As an alternative to modified Newton methods, iteration schemes, which sacrifice superlinear convergence for reduced linear algebra costs, have been proposed. A new scheme of this type is considered here. This scheme avoids expensive vector transformations, is computationally more efficient, and gives improved performance.

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