A fast convergence parallel DIRKN method and its applications to PDEs

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Abstract: In this paper, we propose a fast convergence parallel iteration process for solving a low-order implicit Runge-Kutta-Nystr??m method. The resulting scheme can be regarded as a parallel singly diagonally implicit Runge-Kutta-Nystr??m (PDIRKN) method. On a two-processor computer, this parallel method requires effectively two sequential implicit stages per step. By numerical experiments applied to initial-boundary-value problems for semi-discrete partial differential equations (PDEs), we compare this method with some sequential DIRKN methods from the literature, and show its efficiency in a low-accuracy range which is realistic for these problems. ?? 1995.
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