Parallel iteration of symmetric Runge-Kutta methods for nonstiff initial-value problems

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Abstract: This paper discusses parallel iteration schemes for collocation-based, symmetric Runge-Kutta (SRK) methods for solving nonstiff initial-value problems. Our main result is the derivation of four A-stable SRK corrector methods of orders 4, 6, 8 and 10 that optimize the rate of convergence when iterated by means of the highly parallel fixed-point iteration process. The resulting PISRK method (parallel iterated SRK method) shows considerably increased efficiency when compared with the fixed-point iteration process applied to Gauss-Legendre correctors. ?? 1994.

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