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Linearly implicit methods for stiff problems

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Abstract

In this talk, we show recent techniques for solving stiff Initial Value Problems, which can be either Ordinary Differential Equations, or semi-discretized in space Partial Differential Equations. In particular, we focus on the TASE (Time-Accurate and highly-Stable Explicit) operators, which can be used to stabilize any s-stage explicit Runge-Kutta method of order $p = s$, with $p \leq 4$, showing that this approach leads to linearly implicit numerical schemes, in which it is necessary to solve p linear systems for each stage. Furthermore, we improve the accuracy and stability properties of such methods, reducing their computational cost. Numerical tests for comparison with other linearly implicit methods are carried out.
This is a joint work with L. Aceto, University of Piemonte Orientale (Italy), D. Conte and B. Paternoster, University of Salerno (Italy), D. Hernandez Abreu, S. Gonzalez Pinto and S. Perez Rodriguez, University of La Laguna (Spain).

References

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