Blended General Linear Methods based on Generalized BDF

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Abstract

General Linear Methods were introduced in order to encompass a large family of numerical methods for the solution of ODE-IVPs, ranging from LMF to RK formulae. In so doing, it is possible to obtain methods able to overcome typical drawbacks of the previous classes of methods. For example, stability limitations of LMF and order reduction for RK methods. Nevertheless, these goals are usually achieved at the price of a higher computational cost. Consequently, many efforts have been done, in order to derive GLMs with particular features to be exploited for their efficient implementation.

In recent years, the derivation of GLMs from particular Boundary Value Methods (BVMs), namely the family of Generalized BDF (GBDF), has been proposed for the numerical solution of stiff ODE-IVPs. Here, this approach is further developed in order to derive GLMs combining good stability and accuracy properties with the possibility of efficiently solving the discrete problem via the *blended* implementation of the methods.

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