

Boundedness properties of general linear methods.

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For Runge-Kutta methods, linear multistep methods and other classes of general linear methods much attention has been paid in the literature to important nonlinear stability properties such as total-variation-diminishing (TVD), strong stability preserving (SSP) and monotonicity. Unfortunately, for many useful methods it has turned out that these properties cannot hold. For this reason attention has been paid in the recent literature to related and more general properties referred to by the terms total-variation-bounded (TVB) and boundedness.

In this work an analysis of boundedness properties is provided for the class of general linear methods. We present a framework for deriving optimal step-size conditions which guarantee boundedness. General results are presented for linear multistep methods.