

Order reduction in operator splitting methods

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This is a joint work with Brynjulf Owren

Splitting methods can be applied to ordinary differential equations which can be decomposed into a sum

$$y' = A(y) + B(y)$$

where each term can be integrated separately. The numerical solutions are obtained by composition. Such methods are well known and successfully used in a lot of different applications. However, when the ODE is decomposed into a stiff and a nonstiff part, splitting methods will suffer from order reduction. This order reduction phenomenon will be analysed by a Lie algebraic approach as well as the more classical singular perturbation approach, and the two techniques will be compared.