A Runge-Kutta starter for a multistep method for differential-algebraic systems with discontinuous effects.

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A Runge-Kutta starter for a multistep method for differential-algebraic systems with discontinuous effects

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Abstract

In simulation problems, e.g. in multibody dynamics, realistic models usually incorporate discontinuous effects necessitating frequent restarts of multistep methods. This makes the order and stepsize selection schemes and in particular the starting phase of such methods crucial for their efficiency. In this paper we present a Runge-Kutta starter for an Adams-Bashforth-Moulton predictor-corrector method by giving a detailed description of its construction as well as the ideas behind it with a special emphasis on an appropriate error estimator. Finally we demonstrate its usefulness on some numerical examples.

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Keywords

Multibody dynamics; Multistep methods; Discontinuities; Runge-Kutta method; Error estimation

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