Restarting algorithms for simulation problems with discontinuities

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Abstract

Modelica's language support includes so-called events for describing discontinuities. Modern integrating environments, like Assimulo, provide elaborate event detection and event handling methods. In addition, the overall performance of a simulation of models with discontinuities (hybrid models) depends strongly on the methods for restarting the integration after an event detection. The present paper reviews two restarting methods for multistep methods, both based on Runge–Kutta starters, and presents preliminary first experiments with Assimulo and LSODAR as a proof of concept, which motivates to apply the technique to hybrid systems described in Modelica and simulated by JModelica.org/PyFMI and Assimulo [1, 3, 2].

Keywords: events, discontinuities, hybrid systems, multistep method, Runge–Kutta method, simulation restart

References

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