

Sensitivity Generation for Solutions of Differential-Algebraic Equations with an Adaptive BDF-Method

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Abstract: We describe the principles and algorithms we use in an adaptive BDF-method for sensitivity generation for solutions of initial value problems (IVP) of differential-algebraic equations (DAE) of index 1 with respect to parameters and initial values. The description is based on the techniques used in our integrator DAESOL-II. We will focus on the principle of internal numerical differentiation (IND) to obtain the sensitivities and present a newly implemented backward mode of IND for BDF-Methods, a kind of discrete analogue to solving the corresponding adjoint sensitivity DAE. Finally we will show numerical results of an example to which we applied this approach.

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