

Integration of DAEs with the Taylor Series Method using Automatic Differentiation

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Automatic (or Algorithmic) Differentiation (AD) opens new possibilities to analyze and solve DAEs by projector based methods. In particular, the projector sequence resulting from the tractability index concept can be computed and used for splitting techniques. This approach provides a description of the inherent ODE that makes possible an application of the “classical” Taylor Series Method for integration of initial value problems. So far, AD applications for solving DAEs were based either on the differentiation or on the structural index concept. In this talk, we investigate the advantages of the application of the tractability index concept in this context. In a first approach, general nonlinear index-1 DAEs are examined and solved numerically. For higher-index DAEs different possibilities are considered and compared.