

*Consistent initialization of DAEs using a specific minimum-norm correction*

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We present a new approach to compute consistent initial values and consistent Taylor series for higher index DAEs. The consistent Taylor series result from the constraints and a specification that, for given values, minimizes the correction for the differentiated components and can be described using suitable orthogonal projections. The constraints and the projections are obtained by an analysis of the derivative array provided by automatic differentiation. Computing these projections we simultaneously check whether singularities appear. Our prototype implemented in Python is demonstrated for linear and nonlinear higher index DAEs of moderate size. We place particular emphasis on the differences to methods that are based on a structural analysis.