Exponential Integrators for Differential-Algebraic Equations

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Abstract

We investigate the application of exponential integrators to differential-algebraic equations. Exponential integrators approximate the matrix exponential via polynomial expansion. For large systems the matrix exponential can be approximated efficiently by Krylov subspace methods.

Typically exponential integrators are used for ordinary differential equations. Our goal is to apply these methods to large systems of differential-algebraic equations and reduce the required computational resources inherent in conventional methods. Results will be presented for the time dependent Stokes equation.