High-order PIRK Timesteppers and Mixed Finite Elements for Micromagnetics with Eddy Currents

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Abstract

Our research concerns the numerical solution of the Eddy Currents Equation coupled with the Landau-Lifschitz-Gilbert Equation which is a constrained coupled PDE system. We construct a partitioned implicit Runge-Kutta (PIRK) timestepper with one component being L-stable and the other being quadratic invariant-preserving (QIP). Mixed (Nédélec,Lagrange)-elements are employed for spatial discretization. We discuss using the resulting scheme for simulations as well as validation tests and error estimates. Remarks on software implementation will be provided.
