Efficient Multi-wavelet Representation of the Projector on Divergence-Free Functions

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Abstract

Divergence free vector fields are important in solving problems involving incompressible fluids as well as electric and magnetic fields in magneto-hydrodynamics. We derive an efficient construction using a multiwavelet representation of the projection operator on divergence-free functions in 3-D for arbitrary but finite precision accuracy. This representation is used to solve the Stokes equation as well as the Navier-Stokes equation.

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