

Kinetic-based numerical schemes for incompressible Navier-Stokes Equations *

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Abstract

Numerical schemes for incompressible Navier-Stokes equations based on low Mach and Knudsen number limits of the kinetic equations are presented. Discretisations of the incompressible Navier-Stokes equations are derived based on discretisations of the Boltzmann equation and consideration for the low Mach and Knudsen number limits. In the incompressible Navier-Stokes limit the discretisations reduce to explicit high-order numerical schemes. Numerical results for several test cases and comparisons with other well-known approaches based on projection methods are also presented.

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