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A remark on smooth solutions of the weakly compressible periodic Navier-Stokes equations.

(English) [Zbl 0997.35050](#)

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The author studies periodic solutions of the weakly compressible Navier-Stokes equations for small Mach numbers. The main results of the paper are:

(i) If the initial velocity satisfies a smallness condition in terms of the viscosity, then the system has a smooth solution for all $T > 0$.

(ii) As the Mach number tends to zero, the solution of the compressible system approaches the solution of the incompressible Navier-Stokes equations plus a term which represents the fast waves.

Reviewer: [Klaus Deckelnick \(Brighton\)](#)

MSC:

35Q30 Navier-Stokes equations

76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics

35B10 Periodic solutions to PDEs

Cited in **10** Documents

Keywords:

compressible Navier-Stokes equations; periodic solutions; Mach number; weakly compressible

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