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Asymptotic behavior of the semigroup associated with the linearized compressible Navier-Stokes equation in an infinite layer. (English) Zbl 1181.35172

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The author considers the linearisation of the Navier-Stokes equations in a steady state posed in an infinite layer $\mathbb{R}^m \times (0, a)$. Using the author's previous result that this generates an analytic semigroup [Funkc. Ekvacioj, Ser. Int. 50, No. 2, 287–337 (2007; Zbl 1180.35413)], L^p-decay properties are established for all $1 \leq p \leq \infty$. In contrast to the mixed hyperbolic-parabolic behaviour for the problem posed in the whole space [*D. Hoff* and *K. Zumbrun*, Z. Angew. Math. Phys. 48, No. 4, 597–614 (1997; Zbl 0882.76074)], it is shown that the leading order part of the semigroup for large times is an m-dimensional heat semigroup.

Reviewer: Jens Rademacher (Amsterdam)

MSC:

35Q30 Navier-Stokes equations
35B40 Asymptotic behavior of solutions to PDEs
76N15 Gas dynamics, general

Keywords:

decay estimates; heat semigroup; Navier-Stokes equations

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