The well-posedness theory of global in time weak solutions to IBVPs for the 1D compressible Navier-Stokes equations with large initial data from the Lebesgue spaces is described in the recent review [1]. It contains theorems on the Lipschitz continuous dependence of the solution (η, u, θ) (the specific volume, velocity and absolute temperature) on its initial data (η^0, u^0, θ^0) in the $L^\infty(\Omega) \times L^2(\Omega) \times L^q(\Omega)$ norms. Here $q = 1, 2$ and $Q = \Omega \times (0, T)$.

In this report, by another technique we prove the alternative Lipschitz continuous dependence of the solution in the $L^{2,\infty}(Q) \times L^2(Q) \times L^2(Q)$ norm on (η^0, u^0, e^0) in the much weaker $L^2(\Omega) \times H^{-1}(\Omega) \times H^{-1}(\Omega)$ norm and the free terms in the mass, momentum and internal energy equations in some dual norms; here e^0 is the initial total energy.

Moreover, we consider the case of the rapidly oscillating initial data and apply the above result to derive an estimate of order $O(\varepsilon)$ for their two-scale Bakhvalov-Eglit-type homogenization [2] thus solving a long-time standing problem.

1. A. Zlotnik, Well-posedness of the IBVPs for the 1D viscous gas equations, In: Handbook of Math. Anal. in Mech. of Viscous Fluids, Y. Giga and A. Novotny, eds. Cham, Springer, 2017. P. 1-73.

2. A.A. Amosov, A.A. Zlotnik, Comp. Math. Math. Phys. 38 (7) 1152-1167 (1998).