Antonín Novotný Some remarks to the compactness of steady compressible isentropic Navier-Stokes equations via the decomposition method

Comment.Math.Univ.Carolinae 37,2 (1996) 305-342.

Abstract: In [18]–[19], P.L. Lions studied (among others) the compactness and regularity of weak solutions to steady compressible Navier-Stokes equations in the isentropic regime with arbitrary large external data, in particular, in bounded domains. Here we investigate the same problem, combining his ideas with the method of decomposition proposed by Padula and myself in [29]. We find the compactness of the incompressible part u of the velocity field v and we give a new proof of the compactness of the "effective pressure" $\mathcal{P} = \rho^{\gamma} - (2\mu_1 + \mu_2) divv$. We derive some new estimates of these quantities in Hardy and Triebel-Lizorkin spaces.

Keywords: steady compressible Navier-Stokes equations, Poisson-Stokes equations, weak solutions, global existence of weak solutions, div-curl lemma, Hardy spaces, Triebel-Lizorkin spaces

AMS Subject Classification: 76N, 35Q