Abstract

We consider an initial boundary problem of viscous, compressible, heat-conducting real fluids with density-dependent viscosity. More precisely, we assume that the viscosity $\mu(\rho) = \rho^\lambda$, where ρ is the density of flows and λ is a positive constant. The equations of state for the real flows depend non-linearly upon the temperature and the density unlike the linear dependence for the perfect flows. We prove the global existence (uniqueness) of smooth solutions under the hypotheses: $\lambda \in (2(\gamma-1), \frac{1}{2}]$ and $1 \leq \gamma < \frac{5}{4}$, which improves a previous result. In particular, we also show that no vacuum will be developed provided the initial density is far away from vacuum.