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Anna Duyunova, Valentin Lychagin, Sergey Tychkov

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Anna Duyunova,
Bauman Moscow State Technical University,
Institute of Control Sciences of RAS,
duyunova_anna@mail.ru
Valentin Lychagin,
Institute of Control Sciences of RAS,
University of Tromsø, valentin.lychagin@uit.no,
Sergey Tychkov,
Institute of Control Sciences of RAS,
sergey.lab06@ya.ru

Abstract

Symmetries and the corresponding algebras of differential invariants of viscid fluids on a spherical layer are given. Their dependence on thermodynamical states of media is studied, and a classification of thermodynamical states is given.

1 Introduction

In this paper differential invariants of flows of compressible viscid fluids or gases on a spherical layer are studied.

The thermodynamical state of the fluid is given by the pressure $p(t, x_1, \dots, x_n)$ the density $\rho(t, x_1, \dots, x_n)$, the entropy $s(t, x_1, \dots, x_n)$ and the temperature $T(t, x_1, \dots, x_n)$. The thermal conductivity k of the fluid is constant.

The system of differential equations (the Navier-Stokes system) which describes flows on an n-dimensional oriented Riemannian man-