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On the expanding configurations of viscous radiation gaseous stars: thermodynamic model.

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Summary: In this work, we study the stability of the expanding configurations of radiation gaseous stars. Such expanding configurations exist for a thermodynamic model, given as a class of self-similar solutions to the associated dynamic system with viscosity coefficients satisfying $2\mu + 3\lambda = 0$ for the monatomic gas; that is, the bulk viscosity is vanishing. With respect to small perturbations, this work shows that the linearly expanding homogeneous solutions are stable for a large expanding rate. This is an extensive study of the result in [*M. Hadžić* and *J. Jang*, Commun. Pure Appl. Math. 71, No. 5, 827–891 (2018; Zbl 1390.35246)].

MSC:

35Q85 PDEs in connection with astronomy and astrophysics
35A01 Existence problems for PDEs: global existence, local existence, non-existence
35Q30 Navier-Stokes equations
35Q35 PDEs in connection with fluid mechanics
76E20 Stability and instability of geophysical and astrophysical flows
76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics
35R37 Moving boundary problems for PDEs
35C06 Self-similar solutions to PDEs
35B40 Asymptotic behavior of solutions to PDEs
85A30 Hydrodynamic and hydromagnetic problems in astronomy and astrophysics
85A25 Radiative transfer in astronomy and astrophysics

Keywords:

asymptote; homogeneous solutions; stability; radiation gaseous stars

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