

In Memoriam Adelina Georgescu

ON THE NONLINEAR STABILITY OF A BINARY MIXTURE WITH CHEMICAL SURFACE REACTIONS*

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Abstract

In this work we consider the non linear stability of a chemical equilibrium of a thermally conducting two component reactive viscous mixture which is situated in a horizontal layer heated from below and experiencing a catalyzed chemical reaction at the bottom plate. The evolution equation for the perturbation energy is deduced with an approach which generalizes the Joseph's parametric differentiation method. Moreover, the nonlinear stability bound for the chemical equilibrium of the fluid mixture is derived in terms of thermal and concentrational non dimensional numbers.

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1 Introduction

The convective instability and the nonlinear stability of a chemically inert fluid in a gravitational field heated from below (the classical Bénard problem)

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