CHARACTERISTICS OF FLOWS WITH FLEXIBLE BOUNDARIES

By

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CERTIFICATE

This is to certify that the thesis entitled "Characteristics of Flows with Flexible Boundaries", which is being submitted by Sri Santosh Kumar Pathak to the Indian Institute of Technology, Delhi for the award of the degree of Doctor of Philosophy, is a bonafide research work carried out by him under my guidance and supervision for the last two years and eleven months. His thesis has reached the standard fulfilling the requirements of the regulations relating to the degree.

The results contained in this thesis have not been submitted in part or full, to any other university or institution for the award of any degree or diploma.

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ABSTRACT

Fluid flows with flexible boundaries is a recent field of research activity and the basic stimulus in this direction comes from the possibilities of flow stabilisation and the consequent substantial drag reduction by the use of flexible boundaries. The present investigation is aimed to gain a basic understanding of the phenomenon by studying the effect of a flexible boundary on varied flow situations and thereby to derive generalised features. Typical problems are critically analysed in five vital areas of fluid dynamics namely, oscillatory flows, flows over porous boundaries, visco-elastic flows, hydrodynamic stability and magneto-hydrodynamic stability, and the findings are exhaustively discussed and amply illustrated.

The study of oscillatory flows over flexible boundaries constitutes an altogether new contribution in this recent field of research on flows with flexible boundaries. Also, this investigation makes available an extensive parametric study of hydrodynamic and MHD stability of two, till now uninvestigated, flow situations in the presence of flexible boundaries.

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