MANAV RACHNA
Vidyanatarikshal

6th INTERNATIONAL CONFERENCE of VIJNANA PARISHAD OF INDIA

on

RECENT ADVANCES IN COMPUTATIONAL MATHEMATICS AND APPLIED SCIENCES

(IC-RA-CMAS-2022)

December 9th – 11th, 2022

ABSTRACT BOOKLET

Editors: Dr. Vijay Kumar | Dr. Deepak Kumar

Organized by
Department of Applied Sciences, Faculty of Engineering & Technology,
Manav Rachna International Institute of Research & Studies (MRIIRS)
Faridabad, 121001 Haryana, INDIA

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AN OVERVIEW ON FLOWS DRIVEN BY BOUNDARY WALL MOTION

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Abstract

The lid-driven cavity is regarded as one of the relevant benchmark problems in CFD as it finds similarity with many practical applications. It has been popular since 1960s because of its simplicity in the boundary conditions, as it is used to check the validity of a numerical method to solve Navier-Stokes equation especially for flows driven by boundary wall motion. This review paper focuses on the evolution of flow physics of steady 2D and 3D flow inside a square cavity with one wall moving at a constant velocity, with all Dirichlet boundary conditions. Characteristic singularities for the discontinuous boundary conditions, transition from laminar to chaotic flow, evolution of the flow with variation of Reynolds number (Re) are main matter of concern for the researchers. Several experimental and numerical studies are discussed in this paper in different laminar and chaotic regime, ranges of Re. The formation of the vorticity-stream function has been reported to predict numerically with notable accuracy. Several literatures reported suitable flow-visualization techniques to understand this phenomenon. An overview on this entire topic is given in this paper.