

## Documents

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**Fluid-structure interaction analysis of buoyancy-driven fluid and heat transfer through an enclosure with a flexible thin partition**

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**Abstract**

Purpose: A numerical model of an unsteady laminar free convection flow and heat transfer is studied in a cavity that comprises a vertical flexible thin partition.

Design/methodology/approach: The left and right vertical boundaries are isothermal, while the horizontal boundaries are insulated. Moreover, the thin partition, placed in the geometric centerline of the enclosure, is considered to be hyper elastic and diathermal. Galerkin finite-element methods, the system of partial differential equations along with the appropriate boundary conditions are transformed to a weak form through the fluid-structure interaction and solved numerically. Findings: The heat transfer characteristics of the enclosure with rigid and flexible partitions are compared. The effect of Rayleigh number and Young's modulus on the maximum nondimensional stress and final deformed shape of the membrane is addressed. Originality/value: Incorporation of vertical thin flexible membrane in middle of a cavity has numerous industrial applications, and it could noticeably affect the heat and mass transfer in the enclosure. © 2018, Emerald Publishing Limited.

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