

## عنوان مقاله:

Numerical Investigation on Oscillation Behavior of a Non-isothermal Self-excited Jet in a Cavity: The Effects of Reynolds Number and Temperature Differences

## محل انتشار:

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## خلاصه مقاله:

A self-excited oscillating jet can be naturally produced by discharging a plane jet into a rectangular cavity due to pressure effects and without a need for external aid. In recent years, the self-oscillatory jet in non-isothermal conditions has attracted research interests because of its wide range of industrial applications. Therefore, the current study aimed to compare the oscillatory behavior of downward vertical self-excited jet with Reynolds number ( $Re$ ) 1000 and 3000 under various temperature differences (0, 100, and 300 K) between inletflow and cavity's wall. Computational solutions were obtained using unsteady Reynolds averaged Navier-Stokes (URANS) and energy equations for an incompressible flow. The numerical simulation was carried out by the finite-volume based tool OpenFOAM code. The results showed that depending on the value of temperature difference, oscillatory and non-oscillatory flows were observed. Also, at  $Re=3000$ , the temperature differences can change oscillation frequency up to 10% compared to isothermal conditions. This value reaches 58% at  $Re=1000$ . The results indicated that where the Archimedes number is less than 0.1, the effects of temperature differences between jet and cavity walls on the oscillating behavior are negligible.

## کلمات کلیدی:

Self-excited oscillating jet, Mixed convection heat transfer, Impingement flow

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