

عنوان مقاله:

Effects of Prandtl Number on Three Dimensional Coherent Structures in the Wake behind a Heated Cylinder

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نویسندگان:

S. Ajith Kumar - Department of Mechanical Engineering, Amrita Vishwa Vidyapeetham, Amritapuri, India-۶۹۰۵۲۵

S. Anil Lal - Department of Mechanical Engineering, College of Engineering Trivandrum, Thiruvananthapuram, India-۶۹۵۰۱۷

خلاصه مقاله:

Flow past a heated cylinder kept at constant surface temperature is computationally simulated and analyzed in the laminar regime at moderate buoyancy. In this study, we have restricted to moderate Reynolds numbers to completely eliminate the presence of mode-A and mode-B instabilities. The three dimensional transition due to the mode E instability is captured using a cell-centered finite volume method. The present study reveals the existence of two different kinds of coherent structures - the "surface plumes" and the "mushroom structures". The role of these mushroom structures in the heat transfer mechanism and the changes that the Prandtl number would bring into this coherent structure are discussed. The mushroom structures observed show high dependency on the changes in Prandtl number whereas the surface plumes are found almost unaffected.

کلمات کلیدی:

Thermal convection, Λ , Cross, Vortices, Flow, Mushroom structures, Mixed convection

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