عنوان مقاله:

Numerical Simulation of the Incompressible Laminar Flow Over a Square Cylinder

نویسنده:

خلاصه مقاله:

Simulation of fluid flow over a square cylinder can be performed in order to understand the physics of the flow over bluff bodies. In the current study, incompressible laminar flow over a confined square cylinder, with variable blockage factor has been simulated numerically, using computational fluid dynamics (CFD). The focus has been on vortex-induced vibration (VIV) of the cylinder. Vorticity-stream function formulation of the governing equation has been used and the equations have been discretized using finite difference method (FDM). Different flow analyses have been conducted based on various Reynolds numbers. The results show that, as the blockage factor increases, the vortex wakes detach from the cylinder at higher Reynolds numbers and therefore, the channel walls have a suppressing effect on vortex-induced vibration. In order to ensure the validity of the developed code, incompressible Couette flow has been modeled using the code, and the results have been compared against the analytical solutions with good agreement.

کلمات کلیدی:

Square Cylinder, Bluff Body Aerodynamics or Hydrodynamics, Vortex-Induced Vibration, Finite difference method, Vorticity-Stream Function

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