Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Unsteady flow separation from the surface of two square cylinders arranged in series in shear flow using structural bifurcation analysis.[1] ATENDRA KUMAR, Research Scholar, RAJENDRA K. RAY, Assistant professor — A numerical study of two-dimensional(2D) shear flow past two equal sized square cylinders arranged in series at Reynolds number(*Re)* 100 with shear parameter values (K) ranging from 0.0 to 0.2 is presented here. To describe the flow phenomenon, two different gap ratios, $s/d = 1$, 3 are considered, where $d$is the side length of the cylinder and $s$is separation between the cylinders. The flow is computed using a higher order compact (HOC) scheme for stream-function vorticity form of the 2D Navier–Stokes equations. In this study, we basically want to understand the shear effect on vertex shedding phenomena using topology based structural bifurcation analysis. This analysis exactly predicts the location and the time of the occurrence of the flow separation from the surface of the square cylinders. No such study has been done till date for this problem. Shear rates affect the flow phenomena significantly. The instantaneous stream-function and vorticity contours are presented for different Kvalues to confirm the theoretical study. All our computed results very efficiently reproduce the complex flow phenomena and structural bifurcation analysis confirms the flow separation from the surface of the cylinders.

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Date submitted: 31 Jul 2017 Electronic form version 1.4