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Impact of courant–friedrichs–lewy condition on flow around cylinder at Reynolds number=3900

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Flow around a cylinder has been extensively studied by researchers for several decades. It is a subject of interest for researchers both numerically and experimentally because of its simple geometry but unpredictable flow features. Although this issue has been explored by numerous researchers, a discrepancy still exists in the results, particularly in calculating the angle of separation, recirculation length, and statistics in the wake region behind the cylinder. In the current numerical study, flow around a cylinder at a Reynolds number of 3900 is studied by using large eddy simulation (LES) with ICEM-CFD and fluent tools for meshing and analysis, respectively. The impact of temporal discretization on calculating recirculation length, the angle of separation and statistic behind cylinder wake is investigated. The results extracted from the current simulations are compared with the previous experimental and numerical results. It is observed that accuracy and stability of numerical results highly depend on the Courant–Friedrichs–Lewy (CFL) condition which needs to be kept less than unity.

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