

Abstract Submitted
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Flow around an inclined cylinder with different end plates boundary conditions¹ RAFAEL GIORIA, NDF, Dept. Mech. Eng., Escola Politecnica of University of Sao Paulo, Brazil, GUILHERME FRANZINI, Dept. Naval Eng., Escola Politecnica of University of Sao Paulo, Brazil, JULIO MENECHINI, NDF, Dept. Mech. Eng., Escola Politecnica of University of Sao Paulo, Brazil, ANDRE FUJARRA, Dept. Naval Eng., Escola Politecnica of University of Sao Paulo, Brazil — Numerical simulations of the flow around an inclined circular cylinder are carried out using the Lattice Boltzmann Method with Reynolds number $Re=9,000$ based on the normal component of the free-stream. The wall at the tips of the cylinder are modeled by two different boundary conditions: no-slip condition on the bottom wall and slip boundary conditions on the top wall. The resulting flows are different for an inclined cylinder with bottom tip upstream and another one with bottom tip downstream. This is related to the different boundary conditions on top and bottom. These differences are assessed via force coefficients comparison, near wake probes analysis and near wake visualization of the flow simulations. The main different feature observed is a streamwise vortical structure near the lower tip of the cylinder inclined upstream. This flow structure is not observed at the downstream orientation. The dominance of the upstream end of the cylinder in the wake and the asymmetry of the boundary conditions chosen for the walls seem to be responsible for the differences between upstream and downstream results.

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