Internship Proposal at Buenos Aires University, Argentina

- Dr. Juan D'Adamo - Faculty of Engeneering
- Dr. Veronica Raspa - Faculty of Exact and Natural Sciences

Drag forces reductions in wake flow with oscillating foils

Abstract

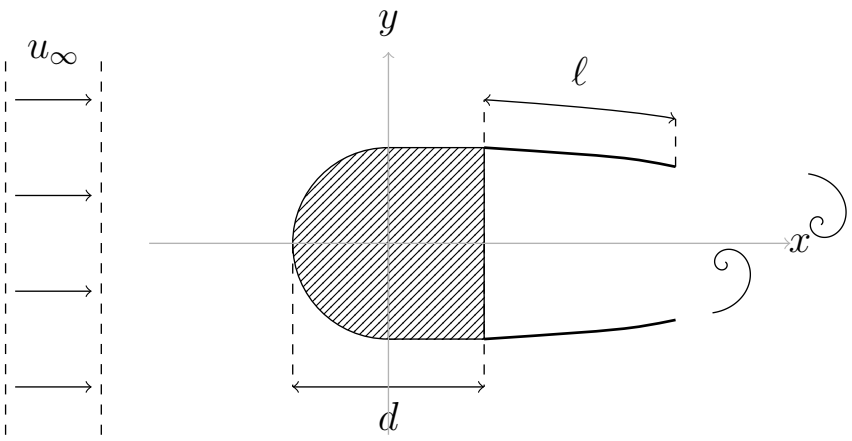
Drag forces in wake flow contribute to a large part of energy consumption in many industrial applications, particularly on transport. Strategies in flow control need solid knowledge on the physical mechanisms that characterizes wake flows. On one hand, active control involve the introduction of energy (e.g. mobile parts, blowing, suction, *ldots*) in a flow while passive control introduce modifications by changing the geometry, material, surface termination, etc.

Wake flows are generally describes by the well known Bénard Von Kármán (BvK) instability, an alternate vortex street pattern. We have worked extensively on the subject in terms of theory (e.g. [1])and control (e.g. [2, 3])

A particular setup of flexible foils added to the surface of a bluff body was tested and it can lead to drag reductions. These are due to reconfiguration, see [4], and hydrodynamical stability properties[5, 6, 7]. On a recent work, [8] obtained drag reductions that can be applied to a better aerodynamical design of trucks. In the present work, we propose to study the strong fluid structure interaction experimentally in wind tunnels for a Dshape body. We will characterize the modifications on the BvK vortex street by reconfiguration and vibrations of the foils induced by the wake. During the internship we propose that the following:

1. Measure drag forces for different rigidities and length of flexible foils.
2. Perform visualizations for the near wake flow with proper illumination and tracers.
3. Determine the kinematics of the flexible foils with fast camera acquisitions.

¨ These measurements, our previous experimental data and numerical simulations will



contribute to elaborate efficient aerodynamical designs to eventually reduce energy consumption.

Workplace: University of Buenos Aires, Argentine. Fluid Dynamics Lab, Faculty of Engineering, & Physics Department, Faculty of Exact and Natural Sciences.

Contact:

- Dr. Juan D'Adamo, jdadamo@fi.uba.ar.
- Dr. Veronica Raspa, raspa@df.uba.ar

References

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