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Sensitivity analysis of small circular cylinders as wake control JULIO MENEGHINI, GUSTAVO PATINO, RAFAEL GIORIA, University of Sao Paulo — We apply a sensitivity analysis to a steady external force regarding control vortex shedding from a circular cylinder using active and passive small control cylinders. We evaluate the changes on the flow produced by the device on the flow near the primary instability, transition to wake. We numerically predict by means of sensitivity analysis the effective regions to place the control devices. The quantitative effect of the hydrodynamic forces produced by the control devices is also obtained by a sensitivity analysis supporting the prediction of minimum rotation rate. These results are extrapolated for higher Reynolds. Also, the analysis provided the positions of combined passive control cylinders that suppress the wake. The latter shows that these particular positions for the devices are adequate to suppress the wake unsteadiness. In both cases the results agree very well with experimental cases of control devices previously published.

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