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Stability and sensitivity analysis of experimental data for passive control of a turbulent wake LORENZO SICONOLFI, SIMONE CAMARRI, University of Pisa, RENZO TRIP, JENS H. M. FRANSSON, Linne' Flow Centre, KTH Mechanics — When the linear stability analysis is applied to the mean flow field past a bluff body, a quasi-marginally stable mode is identified, with a frequency very close to the real vortex shedding one. A formally consistent approach to justify this kind of analysis is based on a triple decomposition of the flow variables[1]. With this formalism, the adjoint-based sensitivity analysis can be extended to investigate passive controls of high-Reynolds-number wakes (e.g.[2]). The objective of the present work is to predict the effect of a small control cylinder on the vortex shedding frequency in a turbulent wake with an analysis which solely relies on PIV measurements available for the considered flow. The key ingredient of the numerical analysis is an ad-hoc tuned model for the mean flow field, built using an original procedure which includes all the experimental information available on the flow. This analysis is here applied to the wake flow past a thick porous plate at Reynolds numbers in the range between Re= 6.7×10^3 and Re=5.3×10^4. It is shown that the derived control map agrees reasonably well with the equivalent map obtained experimentally. [1]Viola,F.,Iungo,G.V.,Camarri,S.,Gallaire,F.,J.FluidMech.750(R1),2014
[2]Meliga,P.,Pujals,G.,Serre,E.,Phys.Fluids24(061701),2012

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