

Abstract Submitted  
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**Optimal perturbation in a channel flow: adjoint-based and riccati-based control comparison** LAIA MORET-GABARRO, PATRICIA CATHALIFAUD, IMFT — Active open-loop and closed-loop control of optimal instabilities amplified in a channel flow is investigated. The control is carried out at both the upper and the lower wall by blowing and suction. The state system considered is parabolic in time. We used both adjoint-based and Riccati-based control theories. In the adjoint-based method, we alternatively solve the state (forward time marching) and the adjoint (backward time marching) systems until convergence towards the optimal control. In the feedback control method, the control is the solution of a differential Riccati equation which marches in time. We show that the adjoint-based (open-loop) and the Riccati-based (closed-loop) control results are very similar. An analysis of the control robustness has been performed to take into account uncertainties coming from the state disturbances (such as surface irregularities, walls vibrations, acoustic vibrations, actuators inputs inaccuracies, etc ...).

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