

Abstract Submitted
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Sensitivity analysis applied to stalled airfoil wake and steady control GUSTAVO PATINO, RAFAEL GIORIA, JULIO MENEHINI, POLI, Sao Paulo University — The sensitivity of an eigenvalue to base flow modifications induced by an external force is applied to the global unstable modes associated to the onset of vortex shedding in the wake of a stalled airfoil. In this work, the flow regime is close to the first instability of the system and its associated eigenvalue/eigenmode is determined. The sensitivity analysis to a general punctual external force allows establishing the regions where control devices must be in order to stabilize the global modes. Different types of steady control devices, passive and active, are used in the regions predicted by the sensitivity analysis to check the vortex shedding suppression, i.e. the primary instability bifurcation is delayed. The new eigenvalue, modified by the action of the device, is also calculated. Finally the spectral finite element method is employed to determine flow characteristics before and after of the bifurcation in order to cross check the results.

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