

NUMERICAL PREDICTIONS OF DETACHED FLOWS

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Key words: Detached flows, high order computational fluid dynamics, stability analysis, transition, adjoint methods, receptivity, uncertainties, aeroacoustics.

ABSTRACT

This mini-symposium invites researchers from academia and industry to share their research interests on the prediction and control of detached flows. Separated flows have a direct impact on aerodynamic forces [1] and have been, typically, difficult to predict though numerical tools due to the flow complexity involved [2] (e.g. prediction of separation point, resolution of recirculation regions, turbulent modelling).

Recent developments in numerical methods for flow computations, flow stability and noise predictions, are prone to provide new physical insight into separated flows. In particular, high order numerical methods [3] (e.g. h/p spectral or Discontinuous Galerkin) that minimise numerical errors can provide more accurate predictions. In addition, flow stability studies and adjoint methods [4] may give better insight into the flow mechanisms triggering flow separation and help on the design of control devices. Finally, numerical advances in noise generation [5] are key elements to understand the mechanisms underlying aeroacoustic noise under separated regimes. The combination of the above techniques is expected to reduce engineering design loops and cost associated to new developments.

These research areas are addressed in the 7th European Research framework project program ANADE (2012-2015), and the mini-symposium will give an overview of the achievements of the project addressing the following topics :

- High order methods for complex flow physics simulation
- Global instability and transition
- Receptivity and sensitivity analyses
- Uncertainties and adaptative algorithms
- Coupling of noise generation and Computational Aeroacoustics (CAA)

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