

Abstract Submitted
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Numerical investigation of the AFRODITE transition control strategy¹ SIMONE CAMARRI, Dipartimento di Ingegneria Aerospaziale - Università di Pisa, JENS H.M. FRANSSON, Linne Flow Centre, KTH Mechanics, ALESSANDRO TALAMELLI, DIEM, Alma Mater Studiorum - Università di Bologna-Forlì — The generation of properly distributed and shaped velocity streaks is a method to delay the Tollmien-Schlichting (TS) transition scenario in a boundary layer. Indeed, it is shown in the literature that stable velocity streaks in a Blasius boundary layer (BL) may lead to a damping of TS waves. This idea is explored in the AFRODITE² project, where streaks are generated experimentally in a Blasius BL by placing ad-hoc miniature vortex generators (MVGs) on the plate wall. In this presentation we show representative results obtained by the numerical setup that has been designed to support the experiments of the AFRODITE project. The DNSs are carried out using an open-source tool, Nek5000, which is a spectral-element code for incompressible flows. A 3D BL solver and its adjoint version are also used as additional numerical tools. The present DNSs include the simulation of the flow around the MVGs, so that the simulated streaks are those effectively generated by the considered devices. Details of the interactions between incoming TS waves and the MVGs are also investigated by DNS.

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