

Abstract Submitted  
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**Flow past a hump in subsonic and transonic regimes: Comparisons between triple deck theory and DNS**<sup>1</sup> GIANMARCO MENGALDO, MARINA KRAVTSOVA, ANATOLY RUBAN, SPENCER SHERWIN, Imperial College London — The prediction of laminar-turbulent transition is a key factor for reducing the drag and for improving the aerodynamic performance of an aircraft. In the past few years several studies, theoretical, numerical and experimental, have been conducted on roughness elements and isolated humps in order to investigate their role in the transition process. Many comparisons already exist between numerical and experimental data while little work has been carried out in comparing theoretical and numerical results. In this work we present a comparative study between triple deck theory and DNS. Specifically we consider a flat plate with a hump of various heights in a compressible regime at a relatively high Reynolds number. Different Mach numbers are taken into account, ranging from subsonic to transonic regimes and various temperatures are applied to the wall for each Mach number considered. The main questions we aim to answer in this work are the following:

- Are triple deck and DNS data comparable and how can we perform this comparison?
- Which are the limits and the advantages of the first (triple deck) and the second (DNS) approach for the simple test case under investigation?

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