TRANSITION MODELLING

Erik Dick
Department of Flow, Heat and Combustion Mechanics
Ghent University, Belgium
erik.dick@ugent.be

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1. Context

The aim of the ERCOFTAC SIG10 on “transition modelling” is development and testing of models for transition of laminar to turbulent state of boundary layer flows. Flow configurations may be internal (turbomachinery) or external (aircraft). The activities include experimental analysis and fundamental simulations (DNS, LES) with the aim of understanding transition mechanisms and determining characteristic parameters useful for modelling. The goal of the mini-symposium is primarily to present recent progress in these subareas by research teams which are member of SIG10. But, of course, papers offered by non-members that fit in these subareas may be included in the mini-symposium

2. Content

There are currently 5 research groups of SIG10 who reacted positively on my call to contribute a paper to ETMM12 in the area of transition modelling, resulting in 6 proposed papers, listed hereafter. The proposals come from 5 different countries, not counting myself (I am co-author of two of the papers). These encompass experimental analysis for providing ingredients of transition models (1 paper), experimental analysis (1 paper) and LES (1 paper) for providing data for model testing, numerical analysis for understanding mechanisms (1 paper), model development (1 paper) and model testing (1 paper); thus representative of all activity areas of SIG10. It is, of course, hoped to add contributions by research groups outside SIG 10.

REFERENCES

E. Bertolini, P. Pieringer, W. Sanz; Graz University of Technology, Austria
Prediction of transition in a turbine cascade using LES

L. Jecker, O. Vermeersch, H. Deniau, E. Croner, G. Casalis; Onera, Toulouse, France
Laminar kinetic energy model based on the Klebanoff-mode dynamics to predict bypass transition on a turbine blade

D. Simoni, D. Lengani, V. Yepmo, M. Ubaldi, P. Zunino; Genova University, Italy
POD reduced order model for proper fragment definition in two-scale transition modelling schemes

D. Simoni, D. Lengani, M. Dellacasagrande, S. Kubacki, E. Dick E.; Genova University, Italy; Warsaw University of Technology, Poland; Ghent University, Belgium
Design of experiments of an accurate data base for transitional flows in variable pressure gradients and flow conditions

S. Kubacki, E. Dick; Warsaw University of Technology, Poland; Gent University, Belgium
Application of an algebraic transition model to loss prediction of an LP- turbine cascade with endwalls

S. Mughal, H. Raposo; Imperial College London, UK
Uncertainty quantification analysis with adjoint linearised Navier-Stokes and role of random distributed surface roughness in disturbance generation and transition