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Using DNS to improve wall-modeled LES of turbomachinery flows[1] KOEN HILLEWAERT, Université de Liège, MICHEL RASQUIN, THOMAS TOULORGE, Cenaero — Argo is developed for scale-resolving simulations in urbomachinery in view of generating reference data for RANS models as well as the prediction of off-design performance. Based on the Discontinuous Galerkin Method, low dispersion and dissipation commensurate with DNS and LES is maintained on an unstructured mesh. Recently, work is ongoing on wall modeling in view of full machine computations. The development of turbulence models in turbomachinery is hindered by the lack of detailed reference data, as usually only experimental data are available. Due to the continuous increase in computational power, it has become possible to generate detailed numerical databases in fully controlled conditions for industrially relevant conditions. The generation and exploitation of such data sets is the aim of the European project HiFiTurb. This contribution focuses on a variant of the axisymmetric transonic bump of Bacchalo and Johnson, storing all of the terms relevant to RANS, as well as time-resolved data in the boundary layer in view of improving modeling for shock-boundary layer interaction conditions.

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