Abstract Submitted
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An investigation into the reduction of log-layer mismatch in wall-modeled LES with a hybrid RANS/LES approach[1] RICCARDO BALIN, Univ of Colorado - Boulder, PHILIPPE R. SPALART, The Boeing Company, KENNETH E. JANSEN, Univ of Colorado - Boulder — Hybrid RANS/LES modeling approaches used in the context of wall-modeled LES (WMLES) of channel flows and boundary layers often suffer from a mismatch in the RANS and LES log-layer intercepts of the mean velocity profile. In the vicinity of the interface between the RANS and LES regions, the mean velocity gradient is too steep causing a departure from the log-law, an over-prediction of the velocity in the outer layer and an under-prediction of the skin-friction. This steep gradient is attributed to inadequate modeled Reynolds stresses in the upper portion of the RANS layer and at the interface. Channel flow computations were carried out with the IDDES approach of Shur et al. in WMLES mode based on the Spalart-Allmaras RANS model. This talk investigates the robustness of this approach for unstructured grids and explores changes required for grids where insufficient elevation of the Reynolds stresses is observed. M. L. Shur, P. R. Spalart, M. Kh. Strelets, and A. K. Stravin, A hybrid RANS-LES approach with delayed-DES and wall-modelled LES capabilities, International Journal of Heat and Fluid Flow 29, 1638 (2008).

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