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**A data-driven hybrid LES/RANS framework for wall-bounded turbulent flows** PASHA PIROOZMAND, PATRICK JENNY, Institute of Fluid Dynamics, ETH Zurich — Large Eddy Simulation (LES) models are promising candidates for highly accurate simulations of turbulent flows. However, their computational cost for resolving near-wall regions can be very high, and thus for many applications, LES is unaffordable. Hybrid LES/RANS models are proposed to overcome this issue. As an instance, a dual-mesh hybrid LES/RANS framework has recently been introduced where LES and RANS simulations are performed on the same domain while different mesh resolutions are employed. To ensure consistency between the solutions relaxation forces are applied to RANS solution in the free shear flow region away from the walls and to the LES solution in the near-wall regions. To further improve the accuracy, we extended this framework by incorporating available sparse experimental data into the RANS simulation using a variational data assimilation technique. The eddy viscosity computed by the RANS model is corrected iteratively using the discrete adjoint method. Due to the tight coupling, also the LES solution is improved and the overall model uncertainty is significantly reduced.

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