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**Sensitized RANS modeling of turbulence: a scale-resolving ERM-based eddy-viscosity model**[1] SUAD JAKIRLIC, BENJAMIN KRUMBEIN, Teschnische Universitaet Darmstadt, Germany, ROBERT MADUTA, OutoTec GmbH, Oberursel, Germany, CAMERON TROPEA, Teschnische Universitaet Darmstadt, Germany, 1 TEAM — A near-wall URANS (Unsteady Reynolds-Averaged Navier-Stokes) eddy-viscosity model based on ellipticrelaxation methodology (ERM) is sensitized to resolve fluctuating turbulence by introducing an appropriately formulated production term into the scale-supplying equation governing the turbulent inverse time scale. The latter term, inspired by the scaleadaptive simulation concept (Menter and Egorov, FTaC 85, 2010), enables an adequate suppression of the modeled turbulence intensity toward the respective sub-scale level. It implies the model's self-balancing between the resolved and modeled (unresolved) contributions to the turbulence kinetic energy. The feasibility of this grid-spacing-free model formulation is checked by computing a series of internal heat and fluid flow configurations featuring boundary layer separation, flow impingement, thermal mixing of flow-crossing streams as well as flows over rough and porous walls. Comparison to under-resolved Large-Eddy Simulations (LES) applying the dynamic Smagorinsky model and to a hybrid RANS/LES model based on the same eddy-viscosity scheme, denoted by VLES (Very LES, Chang et al., IJHFF 49, 2014) indicates an advantage in terms of the predictive capabilities of the presently proposed model, especially on relatively coarser meshes.

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