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An improved dynamic non-equilibrium wall-model for large eddy simulation[1] GEORGE ILHWAN PARK, PARVIZ MOIN, Center for Turbulence Research, Stanford University — A non-equilibrium wall-model based on unsteady 3D Reynolds-averaged Navier-Stokes (RANS) equations has been implemented in an unstructured mesh environment. The method is similar to that of the wall-model described by Wang and Moin [Phys. Fluids **14**, 2043–2051, (2002)], but is supplemented by a new dynamic eddy viscosity/conductivity model that corrects the effect of the resolved Reynolds stress (resolved turbulent heat flux) on the skin friction (wall heat flux). This correction is crucial for accurate prediction of the skin friction and wall heat flux. Unlike earlier models, this eddy viscosity/conductivity model does not have a stress-matching procedure or a tunable free parameter, and it shows consistent performance over a wide range of Reynolds numbers. The wall-model is validated against canonical (attached) transitional and fully turbulent flows at moderate to very high Reynolds number: a turbulent channel flow at $Re_\tau = 2000$, an H-type transitional boundary layer up to $Re_\theta = 3300$, and a high Reynolds number boundary layer at $Re_\theta = 31000$. An application to the flow over NACA4412 airfoil is ongoing and hopefully will be presented.

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