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Near-Wall Modeling for Large Eddy Simulation of Convective Heat Transfer in Turbulent Boundary Layers[1] HYUN WOOK PARK, KIYOUNG MOON, Dept. CSE, Yonsei University, EZGI OZTEKIN, Technology & Management International, RANDALL MCDERMOTT, Fire Research Division, NIST, CHANGHOON LEE, JUNG-IL CHOI, Dept. CSE, Yonsei University — Necessity of the near-wall treatments for the large eddy simulation (LES) without resolving viscous layer is well known for providing a smooth transition from molecular to turbulent transport near wall region. We propose a simple but efficient approach based on modeling of wall shear stress and heat flux that enable accurate predictions of Nusselt number correlations for equilibrium boundary layers. The wall shear stress is directly modeled with Werner and Wengle (1991)'s power law model and wall heat flux is modeled with analogous wall laws between velocity and temperature with Kader (1981)'s empirical correlation. We perform the wall-modeled LES of turbulent convective heat transfer in a channel for various Prandtl numbers. The results show good agreement with the available experimental and numerical data.

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