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Detached-Eddy Simulation Based on the v^2-f Model[1] SOLKEUN JEE, KARIM SHARIFF, NASA Ames Research Center — Detached-eddy simulation (DES) based on the v^2-f Reynolds-averaged Navier-Stokes (RANS) model is developed and tested. The v^2-f model incorporates anisotropy of near-wall turbulence, which is absent in other RANS models commonly used in the DES community. Here, we present preliminary but encouraging results for the proposed model. The constant, C_{DES}, required in the DES formulation was calibrated by simulating both decaying and statistically-stationary isotropic turbulence. Both cases provide the same value of C_{DES}, indicating that the forced case is an alternative way to determine the coefficient. After C_{DES} is calibrated, the v^2-f DES formulation is tested for flow around a circular cylinder at a Reynolds number of 3900, in which case turbulence develops after separation. Simulations indicate that this model represents the turbulent wake nearly as accurately as the dynamic Smagorinsky model. For comparison, Spalart-Allmaras-based DES is also included in the cylinder flow simulation.

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SolKeun Jee
NASA Ames Research Center

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