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Direct numerical simulation for incompressible channel flow at $Re_\tau = 5200$[1] MYOUNGKYU LEE, NICHOLAS MALAYA, ROBERT D. MOSER, The University of Texas at Austin — High-resolution direct numerical simulation (DNS) of wall-bounded canonical channel flow at $Re_\tau = 5200$ is performed. The computational domain is $8\pi\delta \times 2\delta \times 3\pi\delta$ with $10240 \times 1536 \times 7680$ grid points in streamwise(x), wall-normal direction(y), and spanwise(z) directions, respectively. Fourier spectral method(x, and z) and B-splines(y) are used for the the computation of derivatives. In this presentation we demonstrate that the simulation exhibits several features of high Reynolds number wall-bounded turbulence. The value of von Kármán constant appears to be $\kappa = 0.384$ in the region of y^+=300 $\sim$ y=0.2δ where the mean velocity profile shows logarithmic variation. Also, distinct inner(λ_x^+= 800, λ_z^+= 120) and outer(λ_x= 8δ, λ_z= δ) peaks in one-dimensional premultiplied spectra of the velocity variance are observed. Finally, the k_x^{-1} region is observed in the range of y^+= 120 $\sim$ 150 and k_x= 6 $\sim$ 10.

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