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The LES of the channel flow in a non aligned system of coordinates MASSIMO GERMANO, Politecnico di Torino, ANTONELLA ABBÀ, Politecnico di Milano — The plane channel flow continues to be a very important test case for the verification and the validation of LES. In the channel flow test there is a privileged direction, usually one reference axis is oriented along the stream and the size of the computational box is increased in the streamwise direction in order to capture correctly the dominant turbulent structures and to produce a fully developed flow. All that is peculiar of this particular test, and in this paper we will investigate the sensitivity of the channel test to the particular alignment of the coordinate system with the mean flow. In a non aligned system of coordinates there is no privileged direction, there are two components of the forcing term, the mean pressure gradient, and the homogeneities of the Reynolds stresses are destroyed. In our paper we simulate the channel flow in a rotated system of coordinates, and we compare the results with the stream aligned data. We think that this test could evidence the flexibility of different LES codes and LES subgrid models to simulate the turbulent flow and to capture the correct statistical values in non aligned conditions. The first preliminary results are slightly contradictory: the resolved Reynolds stresses seem degraded while the mean flow is better predicted. The dynamic anisotropic subgrid model of Abbà, Cercignani and Valdetaro seems well fitted to represent correctly the large scales in non aligned conditions.

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