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Comparison of turbulent/non-turbulent interfaces in an adverse and zero pressure gradient turbulent boundary layer[1] JONGMIN YANG, JINYUL HWANG, MIN YOON, HYUNG JIN SUNG, KAIST, HYUNG JIN SUNG TEAM — The turbulent/non-turbulent interfaces of the zero pressure gradient (ZPG) and adverse pressure gradient (APG, $\beta = 1.45$) turbulent boundary layers (TBLs) are explored using the direct numerical simulation data ($Re_\tau = 830$), where β is the Clauser pressure gradient parameter. The interfaces are extracted by the method based on the enstrophy magnitude. Depending on the enstrophy, the outer boundary layer flow can be classified into free stream, boundary layer wake, and intermittent flow regimes. In addition, we can analyze the behavior of the intermittent flow regime by changing the threshold. The fractal dimension is obtained by using the box-counting algorithm. The fractal dimensions in the APG and ZPG TBLs are constant over the long range of the box size. The interfaces of the APG and ZPG TBLs show the monofractal behaviors. The geometric complexity of the interfaces in the APG and ZPG TBLs can be represented by the genus, which is defined by the number of handles in the geometric object. The genus in the APG TBL is larger than that in the ZPG TBL. The geometric complexity of the intermittent flow regime is increased in the APG TBL. In addition, we examine the projection area and the volume of the genus and the pockets to analyze the entrainment process in the APG and ZPG TBLs.

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