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Statistics of Stagnation Points in Turbulent Channel Flows with Wavy Walls FABIAN HENNIG, MICHAEL GAUDING, JENS HENRIK GOEBBERT, NORBERT PETERS, RWTH Aachen University — We investigate the turbulent velocity field my means of instantaneous streamlines. The streamlines are partitioned into segments and decompose the velocity field in a non-arbitrary way. The segments are defined by extreme points based on the velocity magnitude. The boundaries of all streamline segments define a surface in space where the gradient of the projected velocity in streamline direction $\partial u/\partial s$ vanishes. This surface contains all local extreme points of the velocity magnitude. Such points also include stagnation points of the flow field, which are absolute minimum points of the turbulent velocity field. The properties of the $\partial u/\partial s = 0$ surface (and thus of stagnation points) are affected by local pressure gradients. Therefore, direct numerical simulations (DNS) of a turbulent flow with wavy walls, which induce complex pressure effects, are conducted. For the DNS a spectral element code is employed. The results have been validated against DNS and experimental data from literature. Based on the DNS the surface $\partial u/\partial s = 0$ is investigated in detail and its interaction with streamlines is visualized. The location and statistics of stagnation points with respect to the specific flow geometry are examined.

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