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Dissipation Element Analysis of Reacting- and Non-Reacting Flows. DOMINIK DENKER, JONAS BOSCHUNG, FABIAN HENNIG, HEINZ PITSCH, RWTH Aachen University — Dissipation element analysis is a tried and tested method for analyzing scalar field in turbulent flows. Dissipation elements are defined as an ensemble of grid point whose gradient trajectories reach the same extremal points. Therefore, the scalar field can be compartmentalized in monotonous space filling regions. Dissipation elements can be described by two parameters, namely the Euclidean distance between their extremal points and their scalar difference in these points. The joint probability density function of these two parameters is expected to suffice for a statistical reconstruction of the scalar field. In addition, normalized dissipation element statistics show a remarkable invariance towards changes in Reynolds numbers. Dissipation element statistics of the passive scalar and the turbulent kinetic energy are compared for different flow configurations including reacting and non-reacting turbulent flows. Furthermore, the Reynolds number scaling of the dissipation element parameters is investigated.

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