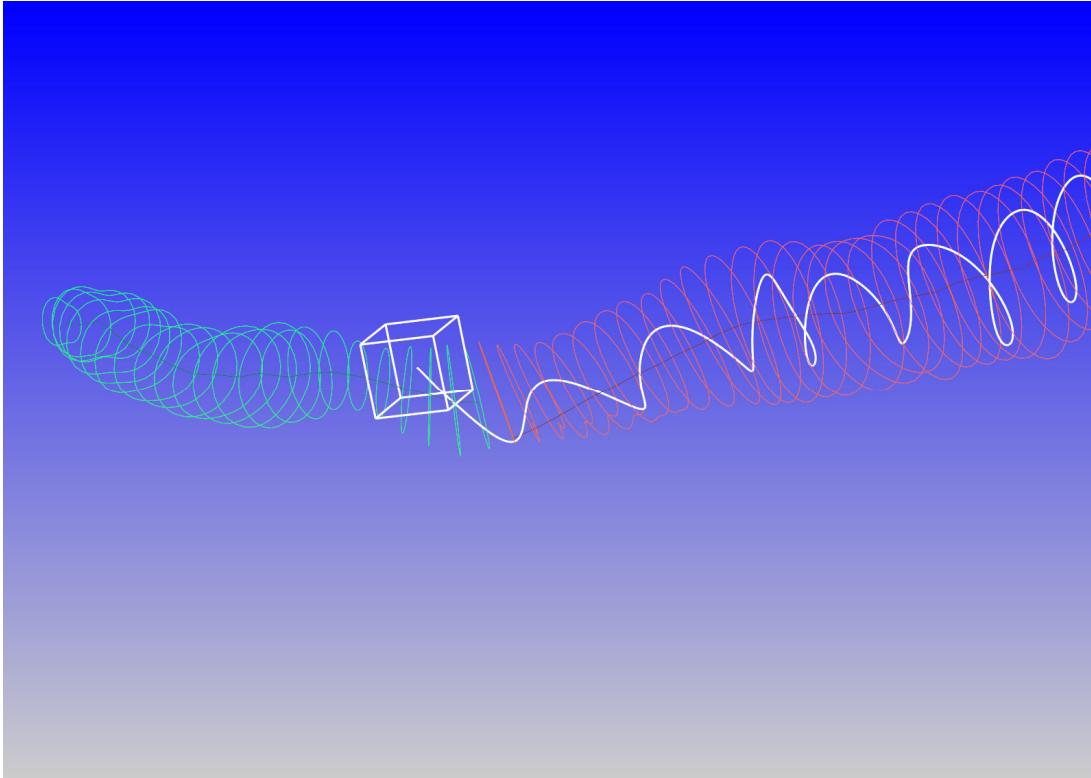


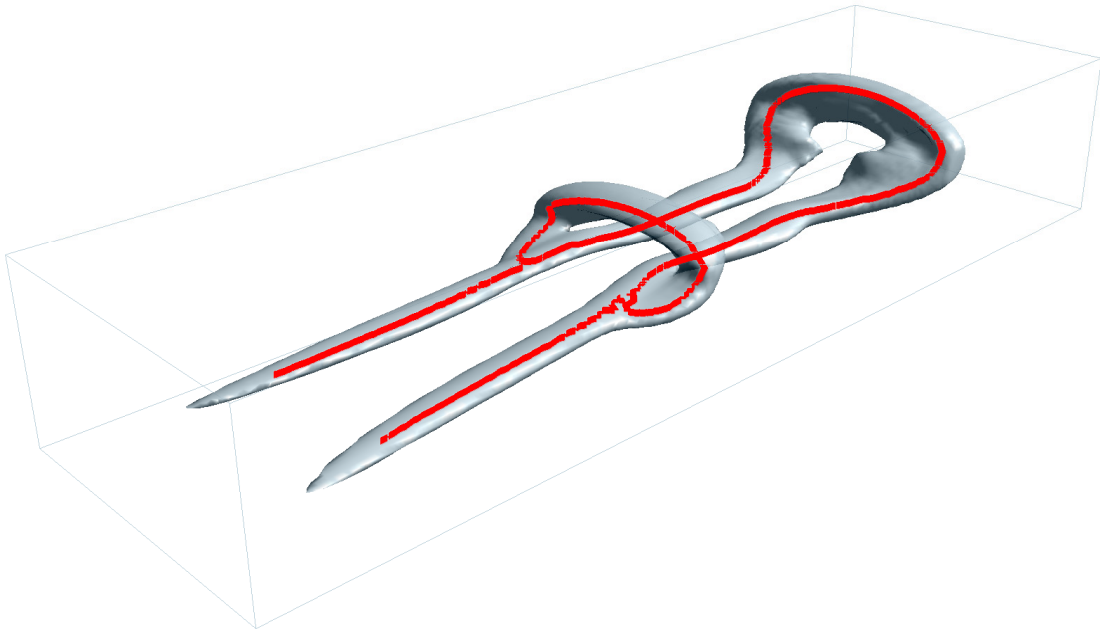
Additional material for paper 1092

Topology-Preserving λ_2 -based Vortex Core Line Detection for Flow Visualization

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Random vortex structures (zoomed view of Figure 5 using Stegmaier's method): the particle trace is started inside the green vortex and moves to the red vortex. In order to neglect the irrotational part of the velocity field, only the velocity induced by the vortical structures is taken into account. It is clearly perceptible, that the particle spirals around a vortex axis even between both vortices. This leads to the assumption of the existence of a connected vortex core line and that the vortex structures are segmented randomly.



Vortex core line bifurcation: this illustration shows a snapshot of a hairpin vortex during an autogeneration process. During autogeneration, the vortex tail is stretched and a new head is created. This leads to feeder vortices spiraling around the existing vortex core line to merge with it. The red vortex core line derived by our method retains the topology of the hairpin vortex.