

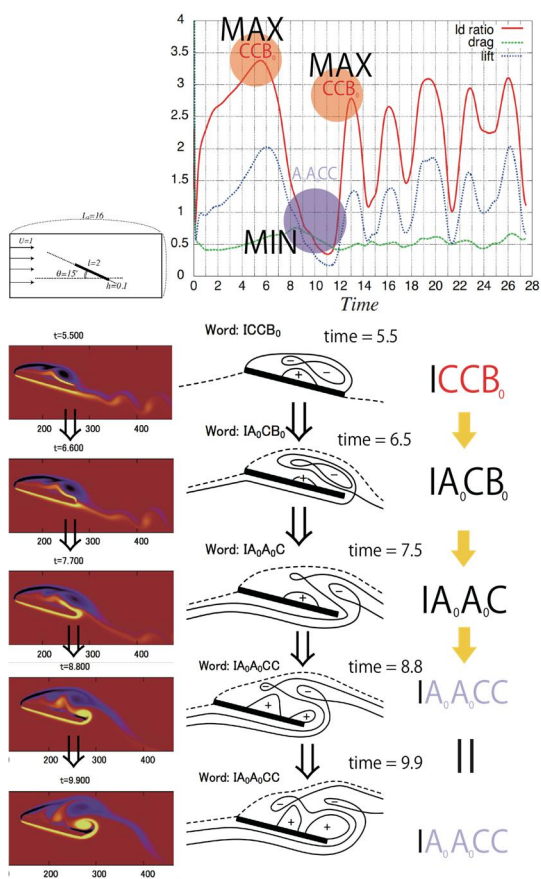
【CL5-3】

Finite representabilities of surface flows

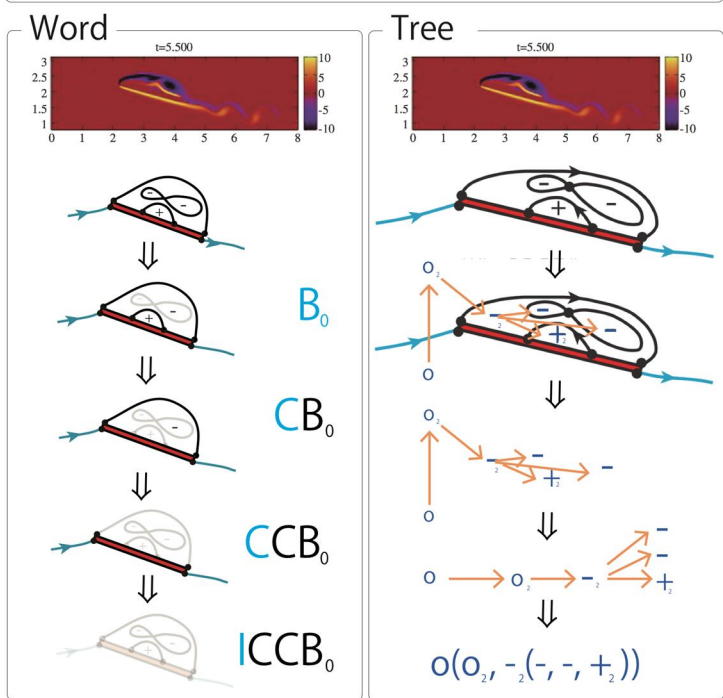
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In this talk, we introduce finite representations of two dimensional incompressible flows. Applying the topological methods to an evolution of an incompressible and viscid flow around an inclined flat plate placed in a uniform flow, we can estimate when the lift-to-drag ratios of the plate are maximal and can determine transient streamline patterns between structurally stable streamline patterns. Moreover, we show that topological structures of generic two dimensional flows can be represented by finite combinational structures. In fact, a flow with non-degenerate singular points and with at most finitely many limit cycles but without quasi-minimal sets on a compact surface can be reconstructed by finite labeled graphs. Finally, we discuss the relations between topological structures and data structures.



Surface flow \rightarrow Tree
 Local stream topological structure \rightarrow Letter
 Global stream topological structure \rightarrow Label + Edge
 { Surface flow of finite type } \rightarrow { Labelled Tree } "1 to 1"



[1] T. Yokoyama, T. Sakajo, *Word representation of streamline topology for structurally stable vortex flows in multiply connected domains*, Proceedings of the Royal Society of London. Series A. **469** (2013) no. 2150 20120558.
 [2] T. Sakajo, Y. Sawamura, T. Yokoyama, *A unique encoding for streamline topologies of inviscid and incompressible flows in multiply connected domains*, Fluid Dynamics Research **46** (2014) 031411.
 [3] T. Sakajo, T. Yokoyama, *Tree representations of streamline topologies of structurally stable 2D Hamiltonian vector fields*, submitted.
 [4] T. Yokoyama, T. Yokoyama, *Algorithms Enumerating Words of Hamiltonian Surface Flow*, submitted.
 [5] T. Yokoyama, *A topological characterization for non-wandering surface flows*, Proceedings of the American Mathematical Society, **144** (2016), pp. 315-323.
 [6] T. Yokoyama, *Graph representations of surface flows*, arXiv:1703.05495, preprint.