

Fig. 1 Apparatuses in present investigation

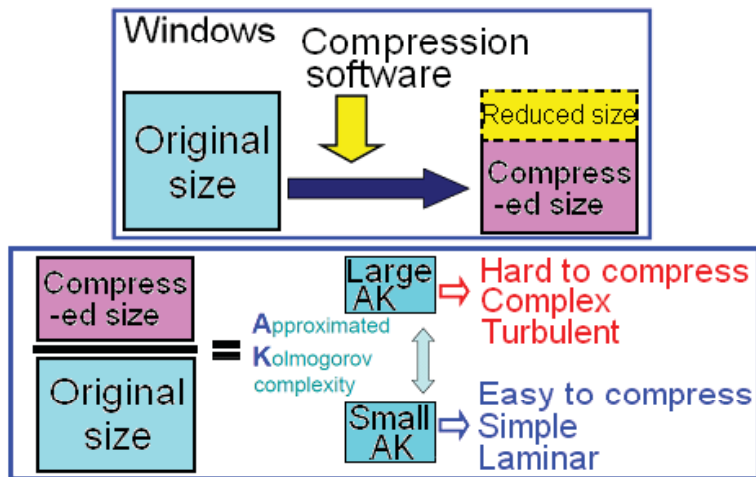


Fig. 2 Schematic diagram of complexity analysis

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In fluid flows, although a turbulent flow and laminar-turbulent transition are often seen in a nature or industrial apparatus, it is hard to say that the details have been clear. Therefore, in our research, especially the laminar-turbulent transition is observed. In the laminar flow, forced transition is generated and the mechanism of transition progress is investigated experimentally.

Main experimental apparatuses are shown in Fig. 1. In (a), from a line of three-dimensional roughness elements in a flat-plate laminar boundary layer a wedge-shaped turbulent region is formed downstream from each roughness elements. In (b), an intermittent jet is periodically ejected in a circular pipe radially, then an isolated turbulent patch is generated within a laminar boundary layer and moves downstream. In (c), oscillating plates at the exit of a rectangular nozzle promote the transition of a mixing layer between the jet and surrounding quiescent air.

Moreover, the new measure which shows the transition process quantitatively is developed with the complexity analysis. Figure 2 shows the schematic diagram.

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