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Visualization of Surface Flow on a Prolate Spheroid Model Suspended by Magnetic Suspension and Balance System TAKUMI AMBO, YUKI NAKAMURA, TAKU OCHIAI, TAKU NONOMURA, KEISUKE ASAI, Tohoku Univ — In this study, the surface flow on a 6:1 prolate spheroid model was visualized by oil flow method in the magnetic suspension and balance system (MSBS). The MSBS is a support-free system for wind-tunnel test in that a model is levitated by magnetic force. In this experiment, the 0.3-m MSBS was installed in the low-speed wind tunnel. The Reynolds number was 0.5 million and the angle of attack was set 0 and 5 degrees. In addition to free-levitation tests, a thin rod simulating disturbance of a support system was placed on the model surface and the influence of support interference was evaluated. The obtained results indicate that complicated separation patterns are present even at zero angle of attack. At $\alpha = 5$, separation pattern becomes more complicated than that at $\alpha = 0$and the streamlines form a highly three-dimensional structure. A characteristic pattern of open separation is observed and a focal point is formed at the end of the separation line. In evaluation of the support interference, the separation is delayed in the downstream of the rod, suggesting that the change of separation pattern is caused by the transition of laminar boundary layer behind the rod. These results indicate that one must take particular care to the support interference in studying three-dimensional separation on a prolate spheroid.

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