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Flow Structure on a Delta Wing of Moderate Sweep Angle During and After Pitch-Up Maneuver ALPER CELIK, ILHAN OZTURK, HABIB CAN TUNC, MEHMET METIN YAVUZ, Middle East Technical University — The flow structure over a moderate sweep angle delta wing is investigated during and after the pitch-up maneuver and compared to the corresponding stationary wing results. The effects of pitch-up rate and Reynolds number on flow structures and their transformations are also studied. Dye visualization is used for qualitative studies and particle image velocimetry is used for quantitative analysis. At early stages of the maneuver the transformation of flow is initiated by the intertwinement of the dual vortex structure.Increasing the angle of attack results in disappearance of the vortex located closest to the leading-edge of the wing which results in a single, large scale, leading-edge vortex that undergoes a distinctive form of breakdown. It is found that the motion of the wing creates a significant time lag on the development of the flow pattern, when compared to stationary wing. In the relaxation period, the vorticity concentrations become more diffuse and elongated as they move towards the plane of symmetry, and away from the surface of the wing. All these features and transformations occur irrespective of values of pitch rates and Reynold's number. On the other hand, it is seen that the lag of flow pattern is a function of pitch rate and Reynold's number.

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