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Leading Edge Vortex Development for a 65° Delta Wing with Varying Thickness and Maximum Thickness Locations

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Abstract : This study focuses on the numerical investigation of the leading edge vortex (LEV) development over a 65° swept delta wing with varying thickness and maximum thickness location and their impact on its overall performance. The tested configurations are defined by a 6% and 12 % thick biconvex aerofoil with maximum thickness location at 30% and 50% of the root chord. The results are compared to a flat plate delta wing configuration of 3.4% thickness. The largest differences are observed for the aerofoils of 12% thickness and are used to demonstrate the trends and aerodynamic characteristics from here on. It was found that the vortex structure changes with change with maximum thickness and overall thickness. This change leads to not only a reduction in lift but also in drag, especially when the maximum thickness is moved forward. The reduction in drag, however, outweighs the loss in lift thus increasing the overall performance of the configuration.

Keywords : aerodynamics, CFD, delta wing, leading edge vortices
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