

Abstract Submitted
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Implicit Large Eddy Simulation of Flow over a Corrugated Dragonfly Wing Using High-Order Spectral Difference Method¹ Z.J. WANG, Iowa State University — Implicit large eddy simulations of flow over a corrugated dragonfly wing at a Reynolds number of 34,000 at high angles of attack have been investigated with a high-order unstructured spectral difference Navier-Stokes solver. The computational results are compared with a recent experimental study by Hu et al. Both 2D and 3D simulations are carried out to assess how realistic and reliable the 2D simulations are in comparison with 3D simulations. At the angle of attack of 16 degrees, the 2D simulation failed to predict the stall observed in the experiment, while the 3D simulation correctly predicted the stall. In addition, the 3D simulation predicted a mean lift coefficient within 5% of the experimental data. We plan to compute at least another angle of attack and compare with the experimental data. The numerical simulations demonstrated the potential of the high-order SD method in large eddy simulation of physically complex problems.

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