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Integrating the Athena Vortex Lattice Code into a Multivariate Design Synthesis Optimisation Platform in JAVA

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Abstract : This paper describes a methodology to integrate the Athena Vortex Lattice Aerodynamic Software for automated operation in a multivariate optimisation of the Blended Wing Body Aircraft. The Athena Vortex Lattice code developed at the Massachusetts Institute of Technology by Mark Drela allows for the aerodynamic analysis of aircraft using the vortex lattice method. Ordinarily, the Athena Vortex Lattice operation requires a text file containing the aircraft geometry to be loaded into the AVL solver in order to determine the aerodynamic forces and moments. However, automated operation will be required to enable integration into a multidisciplinary optimisation framework. Automated AVL operation within the JAVA design environment will nonetheless require a modification and recompilation of AVL source code into an executable file capable of running on windows and other platforms without the –X11 libraries. This paper describes the procedure for the integrating the FORTRAN written AVL software for automated operation within the multivariate design synthesis optimisation framework for the conceptual design of the BWB aircraft.

Keywords : aerodynamics, automation, optimisation, AVL, JNI
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