World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:9, No:01, 2015

Multi-Fidelity Fluid-Structure Interaction Analysis of a Membrane Wing

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Abstract : In order to study the aerodynamic performance of a semi-flexible membrane wing, Fluid-Structure Interaction simulations have been performed. The fluid problem has been modeled using two different approaches which are the numerical solution of the Navier-Stokes equations and the vortex panel method. Nonlinear analysis of the structural problem is performed using the Finite Element Method. Comparison between the two fluid solvers has been made. Aerodynamic performance of the wing is discussed regarding its lift and drag coefficients and they are compared with those of the equivalent rigid wing.

Keywords : CFD, FSI, Membrane wing, Vortex panel method
Conference Title : ICAAA 2015 : International Conference on Applied Aerodynamics and Aeromechanics
Conference Location : London, United Kingdom
Conference Dates : January 19-20, 2015