عنوان مقاله:

Computational Fluid Dynamics (CFD)-in-the-Loop Simulation of an Airship

محل انتشار:

شانزدهمین کنفرانس بین المللی انجمن هوافضای ایران (سال: 1395)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

Airships are always vulnerable under adverse weather conditions because of their bulky sizes. Due to the costs and hazards of flight tests, a comprehensive simulation system would be a useful tool to examine the behaviorof this flying vehicle and will decrease the costs of such flight test. In this study, an attempt is made to compute aerodynamic coefficients and the relevant stress distribution for a typical airship and link them with its6-degrees-of-freedom dynamic simulation system inthe format of a closed loop, in such a way that the results of coefficient operation are transmitted instantly to the simulation system. The whole process is carried out through the proposed simulation system alongside of computational fluid dynamics based aerodynamic prediction system. The modeling and simulationgadgets are designed in OpenFoam and MATLABenvironments and under a Linux platform. Thecomparison of the results between simulations from CFD-in-the-Loop and wind tunnel test flight data for different control inputs exhibits the potency of this idea in improvement of simulation results and flight characteristics predictions.

کلمات کلیدی:

Airship - Dynamic Model - Computational Fluid Dynamics - Aerodynamic Coefficients - CFD in the Loop

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