Development, Verification and Use of Gust Modeling in the NASA Computational Fluid Dynamics Code Fun3d (Paperback)

By Robert E Bartels

Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.This paper presents the implementation of gust modeling capability in the CFD code FUN3D. The gust capability is verified by computing the response of an airfoil to a sharp edged gust. This result is compared with the theoretical result. The present simulations will be compared with other CFD gust simulations. This paper also serves as a users manual for FUN3D gust analyses using a variety of gust profiles. Finally, the development of an Auto-Regressive Moving-Average (ARMA) reduced order gust model using a gust with a Gaussian profile in the FUN3D code is presented. ARMA simulated results of a sequence of one-minus-cosine gusts is shown to compare well with the same gust profile computed with FUN3D. Proper Orthogonal Decomposition (POD) is combined with the ARMA modeling technique to predict the time varying pressure coefficient increment distribution due to a novel gust profile. The aeroelastic response of a pitch/plunge airfoil to a gust environment is computed with a reduced order model, and compared with a direct simulation of the system in the FUN3D code. The two results are found to...

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