



Application of finite elements for computational aeroelasticity

By Ralf Unger

Cuvillier Verlag Okt 2011, 2011. Taschenbuch. Book Condition: Neu. 208x148x22 mm. Neuware - In this thesis, a coupled multiphysical system is considered, whereas the focus is upon aeroelastic problems. For a consistent formulation of such coupled systems, an energy based variational formulation is chosen to describe initially the structural and uid subsystem by Hamilton's principle. Both basic uid model equations - inviscid and viscous uid models - are employed by this weak variational energy principle. This procedure allows to describe the coupled problem by the classical direct two-eld approach as well as by a novel indirect three-eld approach. To discretize the entire system consistently with finite elements, the CBS scheme is employed for the uid domain described by the Navier-Stokes equation in ALE frame of reference. This allows the uid domain to be temporally deformable, which is essential for aeroelastic computations. The CBS scheme is verified for a wide range of typical uid problems ranging from inviscid, viscous, incompressible and turbulent flows. A good agreement with data published in literature and with the further solver TAU are found, which underlines the applicability of the CBS scheme for different uid flow models. The DG-CBS...



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