

A UNIFIED APPROACH TO THE MODEL-REDUCTION OF AERO-ELASTIC SYSTEMS

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Aeroelasticity in the sense considered here arises from the interaction of two dynamical systems: the flow around a body and the mechanical deformations of that body. Often the combined system is far too complex for the computations to be performed; in our case we are interested in the long-term fatigue simulation of wind turbines, with the added difficulty of a stochastic input, i.e. the turbulent wind field. We consider a non-linear Galerkin projection for the combined system, and show the effectiveness for different choices of approximating spaces. The model reduction process is guided by computable error estimates through the use of dual or adjoint techniques. The computational procedure is demonstrated for a typical wind turbine.