

Dynamic Analysis of Rotor Blade System

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Abstract—To make the rotation of the rotor blade more accurate, the elastic deformation in the system is considered in this paper. Firstly, the number and direction of the generalized coordinates are determined by the freedom degree of the blade and the finite element method and Lagrange equation are used to build the dynamical equation of the rotor blade system. Then, we obtain the position vector, the mass matrix, the derivative of Mass Matrix on time and other coefficient matrix according to the principle of flexible multibody dynamics. Finally, the violation correction method is used to get the numerical solution of the dynamical equation in the simulation. Additionally, the angular displacement of the hub around the main axis, the angular displacement of the blade end and elastic deformation in the y-direction and z-direction are analyzed to prove the correctness of the model.

Keyword—rotor blade, elastic deformation, finite element, flexible multibody dynamics.



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