



## Modeling, Stability, and Control of a Rotatable Tail on a Micro Air Vehicle

By Air Force Institute of Technology (U. S. ). Graduate School of Engineering and Management

Biblioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x8 mm. This item is printed on demand - Print on Demand Neuware - This research uses existing experimental wind tunnel data to develop a non-linear model that is used to characterize the stability of a flexible wing Micro Air Vehicle (MAV) with a rotatable tail. The experimental data are curve fit based on either angle of attack or angle of sideslip, and the coupled effect of tail rotation and tail deflection on the force and moment coefficients. Static optimization trims the input and state variables for Steady Level Unaccelerated Flight (SLUF). The resulting initial conditions are fed to an open loop non-linear Simulink/Matlab simulation. The study found that the bare MAV design is unstable, but parametric studies identified practical modifications that could be made to the MAV to improve its open loop stability characteristics. The study found that the coupling affect due to the dihedreal derivative,  $C_l$ , played a large role in destabilizing the lateral-directional dynamics and a feedback Stability Augmentation System is required for flight. 134 pp. Englisch.



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