

ESTIMATION OF LONGITUDINAL AND LATERAL AERODYNAMIC DERIVATIVES FROM FLIGHT DATA USING MAXIMUM LIKELIHOOD METHOD

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Abstract

The paper presents the estimation of longitudinal and lateral (lateral-directional) aerodynamic derivatives from real flight data of Hansa-3 aircraft using Maximum Likelihood (ML) method. The application of the ML method to the flight data of an air vehicle requires the postulation of correct flight dynamic formulations having accurate description of aerodynamic model. The application of the ML method to the flight data with either the measurement noise or the process noise has been accepted as a standard approach for the estimation of the aircraft parameters. A large number of longitudinal and lateral flight data sets were gathered during the flight testing of Hansa-3 aircraft through the execution of controlled maneuvers using elevator and aileron/rudder control inputs respectively. The acquired flight data in compatible form generated for various control input forms has been analyzed during the estimation of aerodynamic derivatives using Maximum Likelihood method. The results obtained in terms of aerodynamic derivatives are reasonably accurate and have been presented in tabular and graphical form. The paper highlights the various factors affecting the estimation.

Keywords: *Lateral-directional, Aerodynamic derivatives, Maximum likelihood method*

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