

# **A BIFURCATION THEORETIC INTEGRATED METHODOLOGY FOR AIRCRAFT CONCEPTUAL DESIGN**

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## **Abstract**

A bifurcation theoretic integrated methodology for aircraft conceptual design is presented in this paper. The methodology uses the extended bifurcation analysis technique to formulate a unified design framework that can be applied for configuration sizing of aircraft, assessment of aircraft performance and stability, and evaluation of aircraft maneuverability. Unlike conventional approaches for conceptual design, the proposed methodology incorporates a full six degrees-of-freedom flight dynamics model for stability and control analysis. Maneuverability evaluation is done with the help of a suitable controller. Configuration sizing of a six-seater general aviation aircraft, followed by performance, stability and maneuverability assessment of the aircraft is successfully carried out in this paper to demonstrate the effectiveness of the proposed methodology.

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