
A Review of Modelling and Analysis of Morphing Wings

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Abstract

Morphing wings have a large potential to improve the overall aircraft performances, in a way like natural flyers do. By adapting or optimising dynamically the shape to various flight conditions, there are yet many unexplored opportunities beyond current proof-of-concept demonstrations. This review discusses the most prominent examples of morphing concepts with applications to two and three-dimensional wing models. Methods and tools commonly deployed for the design and analysis of these concepts are discussed, ranging from structural to aerodynamic analyses, and from control to optimisation aspects. Throughout the review process, it became apparent that the adoption of morphing concepts for routine use on aerial vehicles is still scarce, and some reasons holding back their integration for industrial use are given. Finally, promising concepts for future use are identified.

Keywords: morphing wings; unmanned aerial vehicles; concepts; demonstrators; methods

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