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Multidisciplinary and Multilevel Design Methodology of Unmanned Aerial Vehicles using Enhanced Collaborative Optimization

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Abstract : The present work describes the implementation of the Enhanced Collaborative Optimization (ECO) multilevel architecture with a gradient-based optimization algorithm with the aim of performing a multidisciplinary design optimization of a generic unmanned aerial vehicle with morphing technologies. The concepts of weighting coefficient and a dynamic compatibility parameter are presented for the ECO architecture. A routine that calculates the aircraft performance for the user defined mission profile and vehicle's performance requirements has been implemented using low fidelity models for the aerodynamics, stability, propulsion, weight, balance and flight performance. A benchmarking case study for evaluating the advantage of using a variable span wing within the optimization methodology developed is presented.

Keywords : multidisciplinary, multilevel, morphing, enhanced collaborative optimization
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