Efficient and adaptive parametric modeling for shape optimization of a wingbox

Abstract:
The main focus of this paper is the development of an adaptive wingbox model and its application to a structural wing optimization. The developed model can be fitted to virtually any external aerodynamic wing shape, which is defined by a set of parametrized NACA airfoils. Different parameters of the internal wing structure e.g. number and location of ribs/spars/stringers, their shape parameters and thicknesses can be varied automatically. As the first step, a sampling-based sensitivity study is performed to determine the importance of design parameters for the defined structural performance measures.

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