

## Layout Design Optimization of Spars under Multiple Load Cases of the High-Aspect-Ratio Wing

**Authors :** Yu Li, Jingwu He, Yuexi Xiong

**Abstract :** The spar layout will affect the wing's stiffness characteristics, and irrational spar arrangement will reduce the overall bending and twisting resistance capacity of the wing. In this paper, the active structural stiffness design theory is used to match the stiffness-center axis position and load-cases under the corresponding multiple flight conditions, in order to achieve better stiffness properties of the wing. The combination of active stiffness method and principle of stiffness distribution is proved to be reasonable supplying an initial reference for wing designing. The optimized layout of spars is eventually obtained, and the high-aspect-ratio wing will have better stiffness characteristics.

**Keywords :** active structural stiffness design theory, high-aspect-ratio wing, flight load cases, layout of spars

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