

Abstract Submitted
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Fluttering dynamics of passive flexible wings DANIEL TAM, JOHN W.M. BUSH, MIT, PHYSICAL MATHEMATICS TEAM — We investigate the dynamics of passive flexible wings freely falling under the influence of gravity. Particular attention is given to elucidating the role of flexibility in gliding flight, specifically side-to-side fluttering motion. The effect of bending on the dynamics of fluttering wings is examined through an experimental investigation of deformable rectangular wings falling in water. We demonstrate that the elastic deformations induced by the flow strongly affect the flight characteristics, specifically the period and amplitude of the side to side fluttering motion as well as the descent rate. Our results suggest the existence of an optimal bending rigidity that maximizes the descent time for a particular wing geometry. Biological implications are discussed.

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