

Abstract Submitted  
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**Flight modes and postural stability of wedge shapes<sup>1</sup>** PEJMAN SANAEI, New York Inst of Tech, GUANHUA SUN, HUILIN LI, CHARLES S. PE-SKIN, LEIF RISTROPH, Courant Institute of Mathematical Sciences, New York University — Recent experiments have shown that cones of intermediate apex angles display orientational stability with apex leading in flight. Here we show in experiments and simulations that analogous results hold in the two-dimensional setting of solid wedges or triangular shapes in planar flows at Reynolds numbers  $Re \sim 10^2 - 10^4$ . Slender wedges are statically unstable with apex leading and tend to flip over or tumble, and broad wedges oscillate or flutter due to dynamical instabilities, but those of apex half-angles between about  $40^\circ$  and  $55^\circ$  maintain stable posture during flight. The existence of these “Goldilocks” shapes that possess the “just right” angularity for flight stability is thus robust across dimensions. The stability is also robust to moderate changes in shape and Reynolds number.

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