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The effect of clamping angle on the inverted flag instability¹ CECILIA HUERTAS-CERDEIRA, California Institute of Technology, JOHN E. SADER, University of Melbourne, MORTEZA GHARIB, California Institute of Technology — Inverted flags are cantilevered elastic plates that, when subjected to a flow, are free to move at their leading edge while being clamped at their trailing edge. For a range of free-stream velocities, they are known to undergo a large-amplitude flapping motion. The effect of the clamping angle (or angle of attack of the undeformed plate) on the critical wind speed at which flapping is initiated is investigated. Three distinct behavioral regions can be observed in air. For small clamping angles, where the flow is initially attached, the critical wind speed decreases with angle. For clamping angles larger than 15 degrees, where the flow is always detached, the critical wind speed increases with angle. For clamping angles no flapping occurs. The mechanisms underlying this behavior are explored.

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