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Flight stability analysis under changes in insect morphology ROBERT NOEST, Z. JANE WANG, Cornell University — Insect have an amazing ability to control their flight, being able to perform both fast aerial maneuvers and stable hovering. The insect's neural system has developed various mechanism by which it can control these flying feats, but we expect that insect morphology is equally important in facilitating the aerial control. We perform a computational study using a quasi-steady instantaneous flapping flight model which allows us to freely adapt the insect's morphological parameters. We picked a fruit fly as the basis for the body shape and wing motion, and study the effect of changes to the morphology for a range of wing stroke amplitudes. In each case we determine the periodic flight mode, with the period equal to a single wing beat, and do a Floquet stability analysis of the flight. To interpret our results we will compare the changed morphology to related insects. We discuss the implications of the insects location on the stability diagram.

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