Rapid frequency modulation in a resonant system: aerial perturbation recovery in hawkmoths – Supplemental Information

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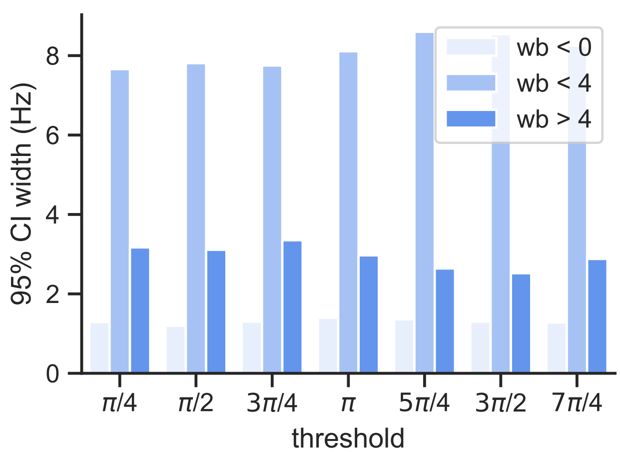
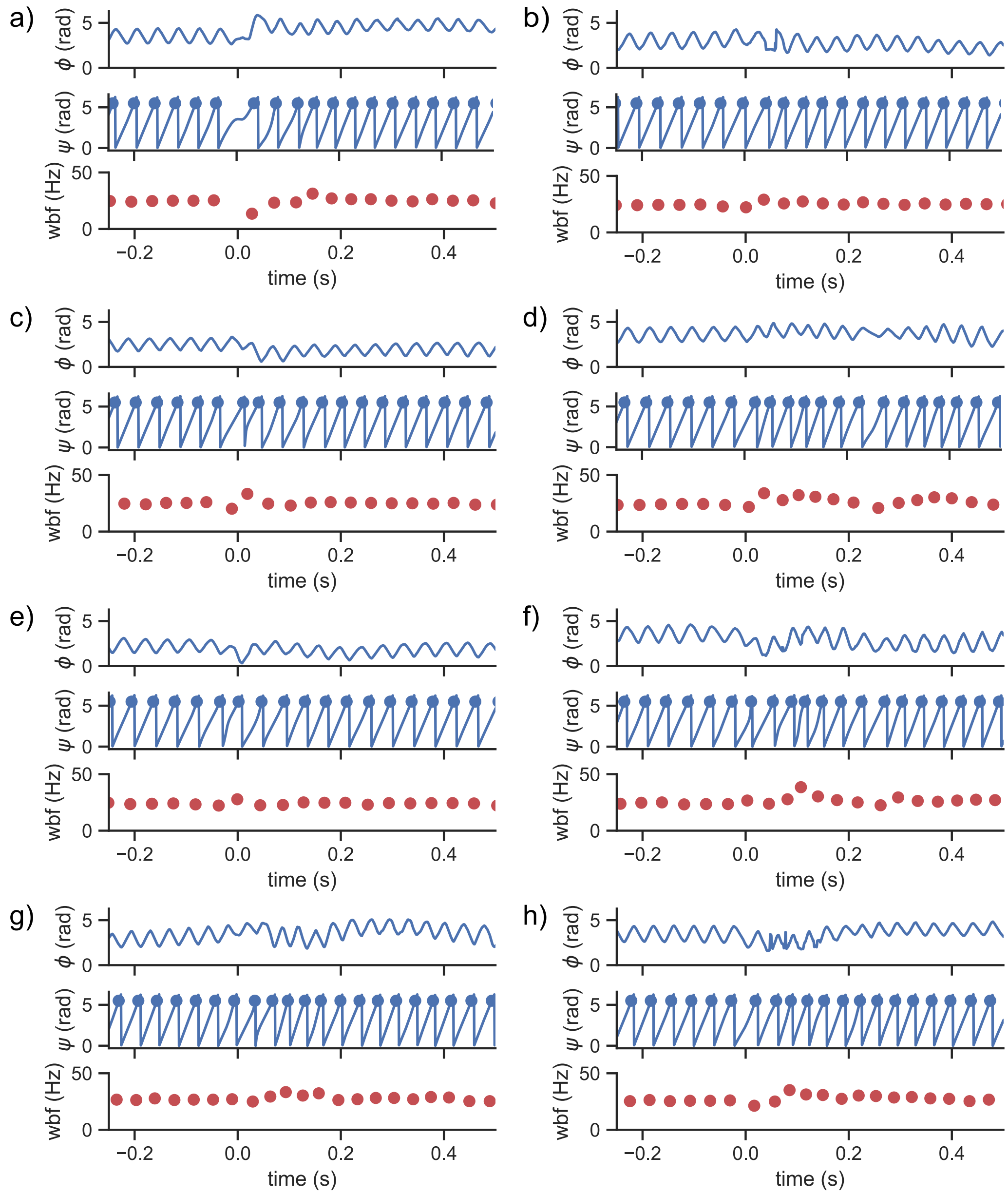


Supplemental Figure S1: Our conclusions of wingbeat frequency modulation are robust to our choice of phase threshold. We used a threshold approach to calculating wingbeat frequency from ψ. Regardless of the threshold, we found that the 95% quantile width is greatest for the four wingstrokes immediately following the perturbation, followed by the subsequent four wingstrokes. The four wingstrokes pre-perturbation have consistently the smallest 95% quantile width.



16 Supplemental Figure S2: a-h) Wing angle (ϕ), instantaneous phase (ψ) and wingbeat frequency (wbf) for the first
17 trial for each of the eight moths used in this manuscript.

Supplemental Movie Captions

Supplemental Movie S1: Rear view movie of a representative perturbation. Video is recorded at 2000 fps and slowed 20x.

Supplemental Movie S2: Top-down movie of a representative perturbation. Video has been background subtracted and points labeled via DeepLabCut superimposed.

Supplemental Movie S3: Video overview of the instantaneous phase method for determining changes in driving frequency.