Response to RC2 Comments

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Method for using spectral flow data to predict vortex-induced vibration onset of static structures

Thank you for the careful reading and constructive comments. We have revised the manuscript to improve notation, source-data traceability, figure clarity, uncertainty discussion, and bibliography as suggested.

Specific Comments

1. *Please use the unit of wind speed as m/s instead of* ms^{-1} *throughout the paper.*
   - A previous editor requested the compact $\mathtt{ms}^{-1}$ notation, but we also prefer `m/s`; we now use `m/s` throughout the manuscript, captions, and tables.

2. *In line 44, please explain the relevant Reynolds number regime for Strouhal number mentioned.*
   - The introduction now states the Reynolds-number regimes for the cited Strouhal data and clarifies that $St \approx 0.2$ is only a first-pass cylinder screening value, not a universal airfoil value.

3. *The variable* A_k*, as shown in equation 5, is not explained in Section 2.1.*
   - Section 2.1 now defines A_k as the one-sided peak amplitude for the kth frequency bin and relates it to the magnitude of X_k.

4. *Please introduce/explain the variable* ϕ_k *in Section 2.1.*
   - Section 2.1 now defines $\phi_k = \arg(X_k)$ and uses it in the reconstruction equation.

5. *Please cite from where the data is taken for Figures 1–3.*
   - The text and captions now state that Figures 1–3 use preliminary NACA 0018 CFD force-history data distributed with VorLap and converted with the repository preprocessing workflow. We also state that these data are used only to demonstrate the method, not as validation data, and that future work will include a high-quality CFD spectral dataset.

6. *In line 112, what is the actual expected Strouhal number for the datasets and why exactly is the Strouhal number increased by 0.07? Also show/cite the datasets for better understanding.*
   - We added the expected high-AoA Strouhal scale of approximately 0.15–0.16, citing Chen and Fang and Bidadi et al. We also clarified that the +0.07 shift is an illustrative offset for the preliminary NACA 0018 example spectra, not a universal correction, and should be replaced by application-matched data or treated as a sensitivity parameter.

7. *Improve Figure 4 by clearly marking the corresponding velocity vectors explained in the section.*
   - We restored the original VorLap geometry rendering to avoid ambiguous manual vector overlays, revised the text/caption to match the generated figure, and retained a small global-axis triad using the verified VorLap convention for this case: inflow direction $(1, 0, 0)$ and rotation axis $(0, 0, 1)$.

8. *Please explain Algorithm 1 further, including the terms worst and above filter thresholds.*
   - Algorithm 1 now uses clearer wording. The text defines the normalized frequency-overlap difference Δ_f, the retained highest-risk case, and the filter thresholds for spectral depth, force-coefficient amplitude, and frequency filtering.

9. *Figure 5 shows that the reconstructed signal is in good agreement with the original (within 5%). How is this calculated?*
   - We removed the unsupported "within 5%" statement. The manuscript now reports the Pearson correlation coefficient between the demeaned original and reconstructed time histories over the plotted 0–2 s window, $r = 0.90$, which better reflects the time-series agreement visible in the figure.

10. *Please mention the dataset source in line 254.*
    - The demonstration setup now states that the turbine example uses the preliminary VorLap NACA 0018 CFD force-history dataset described in the methods section.

11. *How sensitive are the predicted frequency-overlap metrics and reconstructed loads to uncertainties in the source spectral data, such as URANS versus IDDES Strouhal discrepancies?*
    - We added a source-spectral-sensitivity subsection explaining that $f_{\text{shed}} = St\,V_{\text{eff}}/L$, so Strouhal uncertainty directly shifts overlap predictions. We also note that coefficient amplitudes scale reconstructed loads, phase affects time-domain superposition, and URANS alone may be inadequate for resolving separated high-AoA wake-shedding spectra. The manuscript now frames the case as deterministic demonstration rather than probabilistic uncertainty quantification.

12. *The turbine global directions mentioned in lines 310 and 311 can also be represented in Figure 4 for better visualization.*
    - Figure 4 now includes a small x–y–z global-axis triad.

13. *Please correct the listed references because the DOI is broken or the author list/paper name is wrong.*
    - We corrected the listed reference metadata and also fixed related DOI-format and metadata issues for Horcas et al., Zhang et al., and Benner et al. We added Ebstrup et al. for the new sensitivity discussion.

Readability Comments

1. *Grammar needs to be checked for line 29–31.*
   - We rewrote the opening introduction sentences for clarity.

2. *The lines 33–36 need rephrasing, as it is tough to read.*
   - We rephrased the airfoil-shedding and wind-energy motivation paragraph.

3. *A better representation is appreciated to show the inflow velocity range in Table 1.*
   - Table 1 now reports the range as "1–16 m/s in 1 m/s increments."

4. *The lines 297–301 need a grammar check and improvement for better readability.*
   - We revised the paragraph to define the local chordwise and normal unit vectors more directly.

We appreciate the reviewer's suggestions. They led to a clearer and more traceable manuscript. We look forward to uploading and sharing the revised manuscript.