Response to Reviewers

The authors would like to thank Referee #1 and Referee #2 for their assessment of the manuscript and their suggestions on the improvement of the proposed article.

After the comments of Referee #1 regarding the addition of more test points in Figure 6 we noticed discrepancies regarding the results obtained with **constant** values of the calibrating parameters for the setup of Feng (1968). We have updated Figure 6 with the correct results and have modified the corresponding discussion in lines 313-320. Following up on this finding we repeated all computations presented in the manuscript and we confirm that the presented results are final.

Response to Referee #1

All technical corrections have been taken into account and the manuscript has been updated accordingly.

Section: Introduction

-line 69: "The sentence 'in quadrature with the motion velocity' should be 'in phase with the motion velocity' or 'in quadrature with the structural motion', shouldn't it?

The reviewer is correct and the text has been updated with "in phase with the motion velocity".

Section: Methodology

-line 142: "Inconsistent use of italics for mathematical symbol y."

The typesetting has been corrected.

-Eqn 5: "Inconsistent use of italics between this equation and the rest."

The typesetting of Eqn. 5 has been corrected.

-line 189: (Farshidianfar and Dolatabadi, 2013) is cited but the reference is not present in the References section.

The reference has also been included in the References section.

-Fig .2: "Please add sub-captions. Substitute Str *with* St*, and add* Sc*. Use the appropriate sub-captions when referring to the figure in the body text. Extend the caption so the figure is self-contained (everything on the figure should be presented.)"*

The figure has been updated to include sub-captions describing each of the schematics. The schematics themselves have been updated to ensure consistency regarding the symbols.

-Fig 3 – "In panel (b), the same line style is used for both trend lines, making it ambiguous and harder to interpret."

The panel has been updated. The trend lines have been updated to differ both in color and linestyle.

-Fig 3 – Magnus model

The model concerns a single degree of freedom aerodynamic damping model used in VIV prediction. We have included an additional reference where the model is mentioned yet the authors have not found a specific reference in English where this model is first introduced.

Additionally, we have renamed this model throughout the text as “Single Degree of Freedom Aerodynamic Damping Model” or 1DOF-ADM abbreviated.

-Fig 3 – “Please make the contribution of this Figure to the overall discussion of the manuscript more clear in the body text. How does this motivate or relate to the modified Hartlen-Currie model? Maybe you could anticipate that the trend lines will be employed for the model curve-fitting later on.

In line 244 we have add a short introduction as to why this comparison is present: “Current state of the art in VIV prediction can produce reasonable results in terms of maximum amplitude prediction as evidenced in Fig. 3. However, different models varying different degrees of accuracy with respect to Sc.” The peak amplitudes obtained from the smooth trendlines are subsequently employed in the calibration procedure rather than the raw measurement data. This approach minimizes the influence of outliers in the experimental data, such as the anomaly observed in the Belloli test for $Sc = 4.36$”.

-line 265: “I think that you refer to the experimental results of the amplitude as a function of the reduced velocity before presenting them. This may confuse the reader. Please rephrase.”

We have included “The experimental measurements on which the calibration was based alongside the calibrated model’s predictions are presented in Fig. 4 and Fig.6” so that the reader is directed to the experimental data more clearly.

-Fig. 5: “Swap the legend order for consistency with Figure 4. Use different line styles for each Scruton number.”

The legend has been fixed and for each Scruton a different line style is used.

-Fig. 6: “Present the results from your models for more reduced velocities (at least as many as there are experimental points), to show smoother lines.

The figures have been updated with more points. However, inside the lock-in zone and especially near maximum resonance the model, when using the linear parameter decay assumption, shows a behaviour that is inherently not smooth. There is a sharp jump towards maximum response and a fast decay afterwards. As noted at the beginning of this document, a discrepancy was found for the results using the constant parameters approach. We have updated the corresponding plots with the updated results and have repeated computations for all cases presented in the manuscript to ensure that no discrepancies are present. The predictions in Figure 6 with the constant values approach have been updated as well as the relevant discussion in lines 313-320.

-line 361: "'(see the Appendix)' – specify which Appendix"

Appendix references have been made specific wherever necessary.

Section: VIV predictions on a cantilever cylinder

-Fig. 9: "More data points with your model are required (at least as many as there are experimental points).

Additional points have been included. However, the model, depending on the width of the assumed VIV range -as evidenced in Fig. 9 (b)- tends to predict a sharp peak around maximum resonance with the linear decay assumption for the parameters.

-Fig. 9: "Why does the result in Fig. 9(b) corresponding to 'beam – Parameter range: 4.5-10' drop to zero (after U_max) at lower velocities than for the other parameter ranges?"

This is a plotting error – no such behaviour is observed. The plot has been corrected.

-"Thanks for adding the Blevins and Eurocode models to Figure 10. But please comment accordingly."

We have added a brief comment at line 382 of the updated manuscript: "Comparing with the Eurocode and the Blevins model highlights the Eurocode's behaviour in overpredicting the VIV response whereas the opposite is observed with the Blevins model when they are used for a real-world cantilever structure. The calibrated Hartlen-Currie model as implemented in hGAST gives more accurate predictions albeit it is also conservative at the lowest Sc tested."

Section: Appendix C: Eurocode model – Approach 1

-Table C1: "I believe y_{max,j} should be divided by D in both instances it appears in the table. Edit or justify.

Indeed $y_{max,j}$ should be divided by D. The table has been updated.

Response to Referee #2

"I would suggest modifying the name 'Magnus model'. Magnus investigated the lift force on a rotating cylinder, but had nothing to do with the aerodynamic damping function presented below. Also, it should be mentioned that the force on the right-hand-side is assumed as a sinusoidal force for the sake of simplification, because the vortex shedding force is normally a narrow-band spectral force."

The model has been renamed as Single Degree of Freedom Aerodynamic Damping Model – 1DOF-ADM abbreviated. An additional citation in English has been added. However, we have not been able to find a reference in English regarding the introduction of this model.

At Appendix F, regarding this model we have added the clarification regarding the right-hand side: "The right-hand side term treats the aerodynamic lift as a harmonic excitation at the vortex shedding frequency—a justified simplification given the narrow-band nature of vortex shedding forces behind circular cylinders".