Dear Anonymous Referee,

We thank you for your helpful comments and analysis. We have read your suggestions very carefully and have responded to each one below in bold font. All revised portions of the manuscript have been given in red font.

1, Remarks:

Since this work is theoretical, the Fig 1. would deserve to include, the laser, the FB, the cart, servomotor, PVIS, reference corner-cube etc., to give a better and faster idea of the suggested set up.

The construction of the article is globally correct but could be improved. In section 2.1 the authors are detailing a classical spring-mass-damper, in order to say that some frequencies will be attenuated and a signal recorded. It can be shortened, in my opinion;

especially by comparison with the section 3.1 that would deserve more details. There is a lack of consistency in the mathematical symbols used (multiplication, for example) and citing style.

Fig 4 & 5 are not clear, the double scale of the vertical axis makes the reading difficult. It would be clearer with a log scale or zoom box.

Response:

We apologize for our oversights. These issues have been revised as follows.

(1) We have added a new figure (Fig 1.) in the revised manuscript to illustrate the structural relationships between the laser beam, the FB, the cart, the servo motor PVIS, and the reference corner-cube.

(2) Unfortunately, we could not find adequate scope for reducing the length of Section 2. However, we added additional details in Subsection 3.1 to better clarify important aspects of our work. Could please help give some suggestions? Thank you!

(3) We have addressed inconsistencies in mathematical symbols and reference citation styles throughout.

(4) Both Figs. 4 and 5 have been reformatted in the revised manuscript to provide a clearer presentation of results.

2, Questions: (specific comments)

The proposed method is a combination of 2 sub-techniques (PVIS and VECA). But the comparison is global, so it is hard to conclude about the correctness of the sub technique themselves.

What is the sensibility and precision of a PVIS? Can it be compared alone with other techniques?

What if we add prior form of the noise from PVIS into the LSS? Can the VECA be compared with other algorithms taking into account the vibrational signal from the PVIS? l 136. Why add a white noise? Why with this specific variance? l 186.

Why use the genetic algorithm among many others? Gradient? Random walk? Or Machine Learning? l 192.

Why no noise from the fringe signal is considered? l 220.

What are the input and output of the genetic algorithm? What is the variable? Individuals, etc. l 225.

What is exactly the objective function chosen which "is based on the correlation coefficients"? l 226.

In figure 3, in "Is i greater than the maximum number of iterations" is the same i-th time iteration or the i-th iteration of the genetic algorithm? It is confusing. l 236.

The LSS used is Linear or Non-linear ?

Response:

We apologize for our oversights. These issues have been revised as follows.

(1) In an effort to address the reviewer's initial comment, we must first note that current practical applications of PVIS are far from meeting the requirements of instrument stability, accuracy, and precision under different observation conditions, as stated in the introduction. In fact, the calibration error of a standard PVIS used in actual measurements is much greater than the allowable error range of a microgravity absolute gravimeter. As such, PVIS alone is not sufficient for addressing the effects of vibrations in the measurements of absolute gravimeters. This issue is addressed by the proposed VECA, which must be employed in conjunction with PVIS. In fact, it cannot be applied separately. The point of the results presented are that the integrated application of both PVIS and VECA yields absolute gravimeter measurement accuracies that are greater than PVIS alone, and do meet the requirements of practical applications. This sufficiently validates the proposed work.

(2) We apologize for our failure to clarify why we applied a genetic algorithm for solving the VECA. We have clarified this issue in Subsection 3.1 of the revised manuscript.

(3) In the process of the simulations, we verified the anti-interference ability of VECA using the vibration interference models given as equations (3.2) and (3.3). The parameters in (3.2) and (3.3) have been assigned by referencing the actual signal we measured using an actual PVIS system. In addition, white noise has been added to the vibration models.

(4) We also apologize for failing to explain how the VECA solution process is initially conducted and clarify the nature of the objective function. We have clarified these issues in Subsection 3.1 of the revised manuscript.

(5) We have clarified the confusion regarding the index *i* in the original Fig. 3 by revising this as an index *N* in the revised manuscript, which is now given as Fig. 4.

(6) Finally, the LSS employed was linear. This was clarified in the introduction of the revised manuscript.

3, Technical corrections/typing errors:

l 102. nPhi_1 the subscript missing.

l 104, unwanted space before the coma.

l 107. nPhi_2 the subscript missing.

l 119. idem

l 143. k - th

l 147 148. 10 the exponent missing.

l 161. parentheses for cos and sin functions and multiplication sign

l 162. it is equation 2.10 instead of 2.9

l 168. Problems with))

l 171. g_0 the subscript missing.

l 179. it should d+e instead of d-e?

l 203 204. [instead of (

l 210. power

l 214.) instead of]

Response:

We apologize for the many typing errors. These issues have been corrected in the revised manuscript.