

Author's Accepted Manuscript

Vibration attenuation of high dimensional quasi-zero stiffness floating raft system

Yingli Li, Daolin Xu



PII: S0020-7403(16)30659-2
DOI: <http://dx.doi.org/10.1016/j.ijmecsci.2017.03.029>
Reference: MS3641

To appear in: *International Journal of Mechanical Sciences*

Received date: 2 November 2016
Revised date: 8 March 2017
Accepted date: 28 March 2017

Cite this article as: Yingli Li and Daolin Xu, Vibration attenuation of high dimensional quasi-zero stiffness floating raft system, *International Journal of Mechanical Sciences*, <http://dx.doi.org/10.1016/j.ijmecsci.2017.03.029>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Yingli Li^{1*}, Daolin Xu²

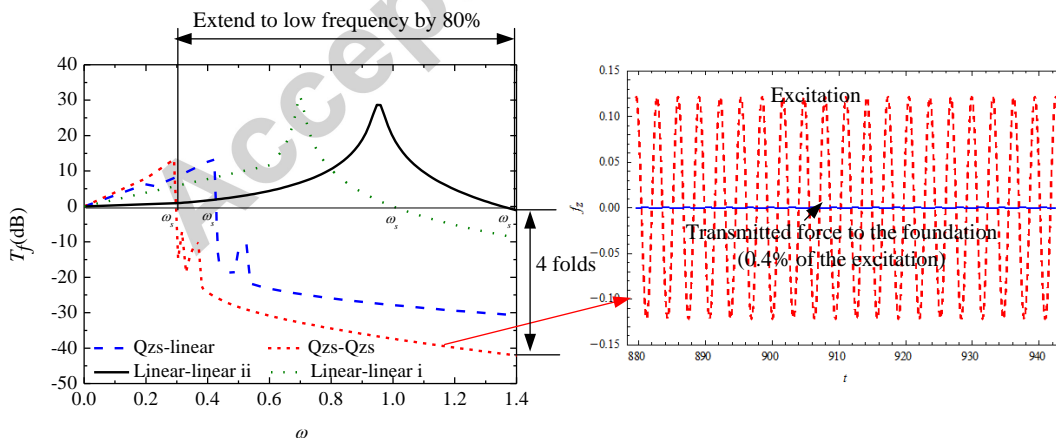
¹School of Traffic and Transportation Engineering, Central South University, Changsha, Hunan 410075, P. R. China

² State Key Laboratory of Advanced Design and Manufacturing for Vehicle Body, College of Mechanical and Vehicle Engineering, Hunan University, Changsha, Hunan 410082, P. R. China

*Corresponding author Tel.: +86 731 84157355. liyingli@csu.edu.cn

Abstract

This paper investigates the vibration attenuation performance of a floating raft system with quasi-zero stiffness (QZS) isolators. A high dimensional mathematical model of the floating raft system with 12 degrees of freedom (DOF) is established for dynamics analysis. The harmonic balance method is adopted to obtain the analytical solution of the high dimensional and coupled system, which permits the study of the nonlinear characteristic and mechanism of the QZS system. The results show that the QZS–QZS system has the lowest force transmissibility and the lowest frequency band for vibration isolation, which is a promising candidate for low frequency vibration isolation even in high dimensional systems. The vibration isolation region of the QZS-QZS system extends to low frequency by 80% compared with the 1 DOF linear system. The force transmissibility of the QZS-QZS system is four times lower than that of the corresponding linear system in vibration isolation region. Amplitudes of the transmitted forces in the x , y , and z directions are 9.8%, 9.8%, and 0.4% of the corresponding excitations.



Graphical Abstract

Download English Version:

<https://daneshyari.com/en/article/5016213>

Download Persian Version:

<https://daneshyari.com/article/5016213>

[Daneshyari.com](https://daneshyari.com)