

RASD2024 Session title: Nonlinear vibration suppression

Co-organizers:

Dr Jian Yang, University of Nottingham Ningbo, China email: jian.yang@nottingham.edu.cn

Prof Hu Ding, Shanghai University, China e-mail: dinghu3@shu.edu.cn

Prof Jason Zheng Jiang, University of Bristol, UK e-mail: z.jiang@bristol.ac.uk

Passive vibration suppression devices such as dynamic vibration absorbers (DVAs) and vibration isolators are widely used for the attenuation of excessive vibrations of a structure or vibration transmission within a system. While such devices have been proved to be efficient in many applications, their performance may be constrained by a linear design. For instance, for a linear vibration isolator, there exists a trade-off between having low spring stiffness for improving low-frequency isolation performance and having a high spring stiffness for a small static deflection. While linear DVA is proved to be effective when its parameters are tuned to match those of a primary system, its use is only affective in a relatively narrow frequency band. A potential solution to enhance the dynamic performance is to exploit nonlinearity, or novel element such as the inerter, in vibration suppression systems. Much recent work on nonlinear vibration isolators such as quasi-zero-stiffness isolators have shown promising performance. Nonlinear vibration absorbers, e.g., nonlinear energy sinks, have also been shown to outperform their linear counterparts. Inerter-based vibration isolators and tuned inerter dampers are shown to have superior suppression performance.

The current session aims to bring together researchers to exchange recent advances in the novel design, analysis, and performance evaluation of nonlinear vibrations systems. Research progresses and contributions on, but not limited to, nonlinear vibration isolators, nonlinear vibration absorbers, nonlinear energy sinks, and inerter-based suppression systems, are welcome. Discussions of the status-of-art and future research questions on high-performance vibration suppression are sought.

Key words: nonlinear vibration isolator; nonlinear vibration absorber; inerter; nonlinear energy sink