

NEXT DYNAMICS COLLOQUIUM

Dynamic Vibration Absorbers: Revisiting Classical Results and Introducing New Tuning Strategies

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Abstract

The classical dynamic vibration absorber is an effective passive vibration mitigation device widely used in, e.g., civil and automotive applications. This presentation first revisits the well-known equal-peak method proposed by Den Hartog almost one century ago. We show how an exact closed-form solution to the H_∞ optimization problem can be derived. In view of the narrow bandwidth of the dynamic vibration absorber, we then introduce new tuning strategies adapted to uncertain or nonlinear resonances. The mitigation of multiple resonances of a host structure is also discussed. The second part of the presentation addresses novel practical designs of dynamic vibration absorbers, which include piezoelectric shunting with electrical and digital circuits.

Bio and research area

Gaëtan Kerschen is a Professor of Aerospace Engineering in the Aerospace and Mechanical Engineering Department at the University of Liège, Belgium. He founded and directs the Space Structures and Systems Laboratory (S3L). His publications are primarily in the areas of structural dynamics (with a particular focus on aircraft and satellite structures) and orbital mechanics. He teaches courses in satellite engineering, nonlinear vibrations and astrodynamics. He is the co-founder of NOLISYS, a startup company which provides solutions and software for nonlinear vibrating systems. Gaëtan Kerschen has written more than 100 peer-reviewed journal papers. He is the recipient of prestigious international awards including two European Research Council (ERC) grants, the Doak Award from the Journal of Sound and Vibration and the SAGE Publishing Young Engineer Award. He has also received the Belgian Francqui Chair at the Vrije Universiteit Brussel. He was one of the principal investigators of the OUFTI-1 nanosatellite launched by the Soyuz rocket on April 25, 2016 for which he was awarded the Walloon Medal for Merit (Chevalier du Mérite Wallon).

Date: Monday, June 3, 2019
Time: 5:00 pm
Place: HIL E 4, [ETH Hönggerberg](#), Stefano-Francini-Platz 5
Host: [Prof. Dr. Eleni Chatzi](#)