

Suppression of Aeroelastic Instability by Means of Passive Targeted Energy Transfer

Seminar Presentation by

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ABSTRACT:

The tuned vibration absorber is an effective device for vibration suppression in many mechanical systems including bridges and buildings. However, this passive energy sink can only operate at a single frequency and is incapable of attracting robustly multi-frequency transient disturbances. In order to overcome this limitation, the nonlinear energy pumping phenomenon, which corresponds to the one-way channeling of vibrational energy from a primary system to a passive nonlinear sink, is investigated in this presentation. The mechanisms governing this dynamical phenomenon will first be analyzed using the nonlinear normal mode theory. The second part of the presentation will demonstrate that a nonlinear energy sink can improve the stability of an aeroelastic system consisting of a 2DOF rigid airfoil. Experimental results corroborating the theoretical analysis will also be provided.

BRIEF BIO:

Gaëtan Kerschen is a postdoctoral researcher in the Aerospace and Mechanical Engineering Department at the University of Liège (Belgium). He received a Ph.D in Aerospace Engineering from the University of Liège in 2003. In 2003 and 2004, he was a visiting postdoctoral fellow at National Technical University of Athens (Greece) and at the University of Illinois at Urbana-Champaign. He is author of approximately 40 journal papers and about 50 conference papers. Most of his current and past research work has dealt with nonlinear oscillations, structural health monitoring, finite element model validation and system identification.