

## **Periodic orbits of nonlinear mechanical systems: computation, interpretation and constructive utilization**

**Gaetan Kerschen (ULg)**

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The presentation discusses the concept of periodic orbits and their usefulness for interpreting the dynamics of nonlinear mechanical systems. An algorithm for their computation from mathematical models is introduced and is first applied to a two-degree-of-freedom system. This seemingly simple system possesses complicated dynamics, including a countable infinity of periodic orbits. The periodic orbits of a more complex system, a full-scale aircraft, are then examined.

Systems that possess attachments with essential nonlinearity are discussed in the second part of the presentation. The structure of their periodic orbits reveals that irreversible energy transfer can be observed between the host structure and the nonlinear attachment. This paves the way for a constructive utilization of nonlinearity for vibration mitigation.