



Identifiant de la contribution : 315

Type : non spécifié

”JJCAB3#7 - A experimental parametric study of brake squeal”

lundi 10 juillet 2023 11:50 (5)

Many systems have vibration properties, modes, and non-linear limit cycles, that are significantly affected by environmental properties such as temperature, pressure, rotation speed. Brake systems can have a mode coupling instability, known as squeal, for certain parameter combinations. It has also been previously observed that the limit cycle frequency evolves periodically with wheel spin, further motivating the need to study parametric variations.

An experimental campaign was designed to characterize parametric evolution of limit cycle properties with pressure, wheel spin, and to a lesser extent the testbed torsion mode and temperature. Short term Fourier transforms clearly indicate parametric variations but have limitations in their ability to track properties varying in time. A multi-output harmonic balance signal model varying slowly in time is estimated using a process mostly based in synchronous demodulation.

The relevance of this model for the analysis limit cycle sensitivity is illustrated for different test runs showing intermittent squeal, transition between multiple instabilities, evolution of limit cycle properties with wheel position, pressure, ... The analysis of principal coordinates in the process demonstrates the changes in shapes for different conditions.

Presenter(s) : GUILHERME MALACRIDA ALVES

Classification par session : JJCAB3