

Systems and Method of Analyzing Vibrations and Identifying Failure Signatures in the Vibrations

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DESCRIPTION

This invention is a method for measuring and analyzing vibration. The method involves collecting a vibration data. Intrinsic mode functions (IMFs) are extracted as most energetic to indicate intrinsic oscillatory modes in the collected vibration data. A stability spectrum is generated for the vibration data from the IMFs. A non-linearity indicator is displayed in the stability spectrum, where the non-linearity indicator indicates a transition from stability to instability. The stability spectrum and the non-linearity indicator are applied to the data to isolate unstable vibrations for indicating a change in material stiffness.

FEATURES AND BENEFITS

- The technology easily identifies changes in material stiffness and the onset of a structural failure.
- The method provides reliable dampening predictor indications for understanding vibrational instability in modern airborne structures, thus making it helpful in analyzing flexible light-weight airborne structures.
- The method allows to predict stability margins even for aeroelastic structures for understanding structural dynamic instabilities such as flutter, thus determining the onset of instability in aero-elastic structures from the flight data to provide valid flight flutter prediction information, and hence improving flight safety.

APPLICATIONS

- Aerospace
- Aviation
- Automotive
- Structural Health Monitoring

FOR MORE INFORMATION

If you are interested in more information or want to pursue transfer of this technology, GSC-14833-1, please contact:

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