IMAC XL III

10-13 Februar 2025

Place:

Orlando, Florida, USA

Title:

Making modal analysis easy and more reliable – Challenging AI-based algorithms with the BARC example

Author:

Tim Kamper, Denis Beljan, Patrick Hüskens, Haiko Brücher

Abstract:

Though modal analysis is a common tool to evaluate the dynamic properties of a structure, there are still many individual decisions to be made during the process which are often based on experience and make it difficult for occasional users to gain reliable and correct results.

The paper will present how on different steps of the process experience based decisions can be supported and replaced by automated evaluations to make modal analysis accessible to less experienced users. In addition to traditional methods such as the Least-Squares Complex Frequency-domain (LSCF) estimator the presented approach takes advantage of more innovative methods such as a neural network to reduce experience based decisions increase reliability.

The advantage of the presented approach will be shown based on the example of a Box Assembly with Removable Component (BARC). BARC is known as a challenge structure for approaches for the evaluation of dynamic properties. In the study two groups of users will be exposed to perform a modal analysis of the BARC. The groups will be selected as heterogeneous groups with different levels of experience in modal analysis. The first group will perform the modal analysis based on classic algorithms and methods whereas the second group will be supported by AI based technology.

HEAD acoustics GmbH
Ebertstraße 30a
52134 Herzogenrath, Germany

Patrick Hüskens
Mail: info@head-acoustics.com
Telephone: +49 2407 577-0