

Semester project or master thesis

Novel investigation strategy for analyzing nonlinear vibration systems in experimental vibroacoustics

Topic

In the field of experimental vibration analysis, various methods have been established for investigating structures for nonlinear vibration behavior. One possibility is excitation with the aid of a vibration exciter (shaker, see picture on the right, for example B&K Type 4809, <https://www.bksv.com>). The structural response is measured in various ways using accelerometers or scanning laser Doppler vibrometers. So-called step-sine tests are often performed. Here, a controller controls the desired force amplitude of a sinusoidal excitation with a certain frequency, measures the structural response and moves to the next frequency. This is additionally performed for different force amplitudes. The resulting effort for such measurements is enormous.



To this end, a new strategy will be developed to make such tests more efficient. This will be realized and finally visualized with a novel measurement value processing.

Tasks

- Literature review on similar systems (Step-Sinus, data analysis, etc.).
- Analysis of existing concepts and/or new or further development
- Construction of a simple test bench
- Test and validation of the measurement strategy

Requirements

- High interest in the subject of vibro-acoustics and the dynamics of complex structures and systems.
- High interest in experimental studies
- Knowledge in experimental vibration analysis, engineering dynamics
- Knowledge in Matlab/Python

English or German language is possible for this thesis.

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