



QUANTITATIVE MODAL VERIFICATION & VISUALIZATION

Assignment

Develop and test one or several methodology(ies) to compare the predicted mode shapes with the measured mode shapes in a quantitative way. The results shall be presented with intuitive visualizations.

Activities

- Measure and visualize the relevant mode shapes on our demo setup by means of modal analysis.
- Develop tooling and scripting to quantitatively compare measured mode shapes with FEM models by means of the Model Assurance Criterion.
- Validate the accuracy of the method by introducing intentional physical changes in the setup and compare the mismatch in mode shapes between prediction and the measurement.
- Develop a methodology to visualize unpredicted modes shapes by simulating them in the FEM solution.

Context

In the development of high tech systems, dynamic behavior plays an important role in the system's performance. As the demand on both the performance and the predictability of new generations of machines grows, the dynamic behavior is modeled to a greater extend.

Internship overview

- Master Student
- Internship Assignment
- Mechanical / Control Engineering
- Location: Nuenen

Technologies

- Modal analysis
- Eigen modes
- Eigen frequency
- FEM
- Experiments
- Model Assurance Criterion



Mode-shapes regularly play a critical role in the system performance and their design thus need to be verified. This is often done by means of “modal analysis”, where the system is excited and the accelerations are measured at different locations. With the need of increased predictability, we need to look further than just a match in Eigen frequencies. We also have to look quantitatively at the match between the predicted and measured mode shapes by using the Model Assurance Criterion.



modal validation on a setup

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Would you like to know more about this student assignment?

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