Guitar Engineering 6: Can You Hear the Sound of a Guitar (Model)?

Art will always be part of guitar designing and building. But engineering has much to offer this field as well. This capstone project will explore various aspects of the use of engineering tools in the design and manufacture of guitars.

Today, models of guitars that can predict the results of structural modifications are essentially non-existent. Rather, the industry relies almost entirely on “cut and try”. We mean to amend this situation.

The Guitar Engineering capstone project will consist of the following elements:

* Apply the principles of Isospectral Systems to guitar design.
* Design, model, and manufacture acoustic guitar components.
* Investigate the use of Additive Sine Synthesis to hear the sound of a guitar model.
* Assess model predictions through testing.

What the students will learn:

* Fundamentals of acoustic engineering
* Vibration scanning of guitars using a laser vibrometer in order to obtain baseline vibration signatures
* Generating CAD and analysis models of guitars that are vibration calibrated
* Predicting guitar performance after structural modifications
* Evaluating alternative materials and processes for guitar building

This project will interact with local guitar manufacturers such as Gibson Acoustic Guitars.

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