ENR145 Final Project Templates

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This is your title page

Your name

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Introduction

- Introduction with a big picture: explain what is the application of your simulation.
- Address the problem you tackle, what makes your model challenging yet exciting.

Methods

- Explain the main methodologies and modeling techniques.
- Highlight what makes your project unique or how you tackle the technical bottleneck.

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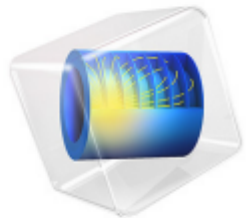
This is an example:

Created in COMSOL Multiphysics 6.3



Heat Generation in a Vibrating Structure

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Introduction

When a structure is subjected to vibrations of high frequency, a significant amount of heat can be generated within the structure because of mechanical losses in the material such as, for example, viscoelastic effects.

Need some schematics here to show the general idea.

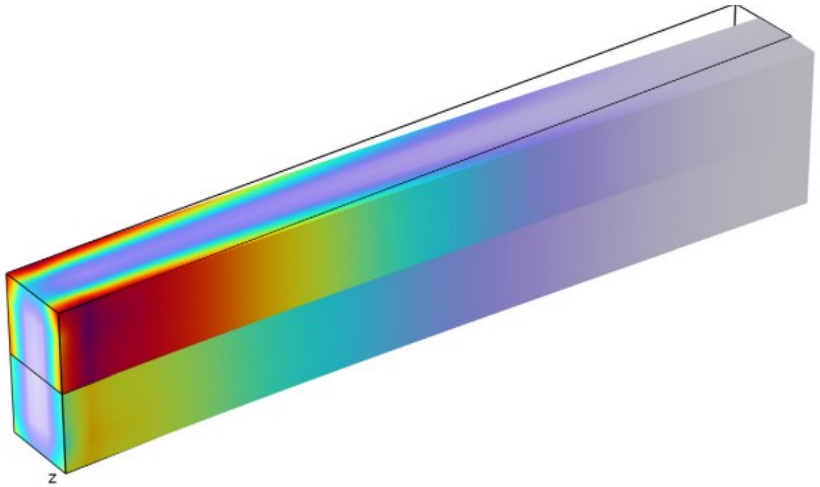
Methods

In this example, I model the slow rise of the temperature in a vibrating beam-like structure. I use a transient heat-transfer problem with source term which represents the heat generation due to mechanical losses. The simulation is based on a structural analysis performed in the frequency domain.

Model Definition

The beam consists of two layers made of aluminum and titanium, respectively, with the corresponding loss factors 0.001 and 0.005. One end of the beam is fixed, and the other one is subjected to periodic loading in the z direction, which is represented in the frequency domain as $F_y \exp(j\omega t)$, where j is the imaginary unit, and the angular frequency is

$$\omega = 2\pi f$$



Add any screenshots here to show your model will be promising.
Use more than one slides if needed.

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Don't forget to cite any sources that helped you when making this proposal.
COMSOL. Heat generation in a vibrating structure. Retrieved from 3/12/2026 https://www.comsol.com/model/heat-generation-in-a-vibrating-structure-2205