

Structural optimization method for space structures under dynamic loading

Task

To develop structural optimization method to enhance the dynamic structural performance of space structures by analyzing the sensitivity of the design domain using techniques such as topology [1], topography, and size optimization.

- Formulate numerical design responses to enhance structural performance under random vibrations across a specified amplitude and frequency spectrum.
- Investigate various derivative-based structural optimization methods to achieve optimal thin-walled housing components reinforced with ribs.
- Implement a Python-based software tool to supervise the entire optimization loop for the design assembly.
- Demonstrate the structural improvements and benefits achieved through the optimized designs.

Project Characteristics

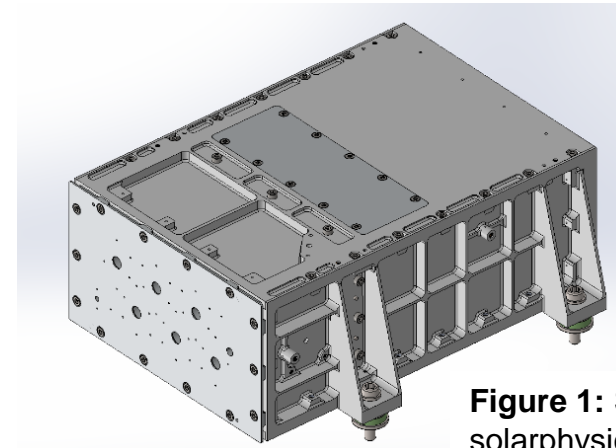
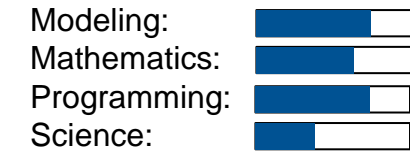


Figure 1: Space Instrument for solarphysical measurements

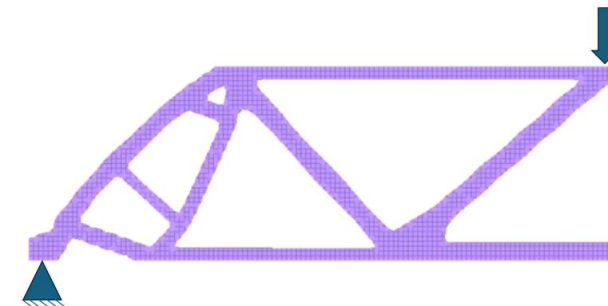


Figure 2: Topology optimization through SIMP [1] approach

[1] Sigmund, Ole & Maute, Kurt. (2013). *Topology optimization approaches A comparative review. Structural and Multi-disciplinary Optimization*. 48. 10.1007/s00158-013-0978-6.