



New Isogeometric Analysis Software for Seamless Integration of Design and Analysis

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing the first analysis method of its kind that can automatically create meshes from computer-aided design (CAD) models without any approximation and with superior analysis efficiency.

Overview

Finite element analysis (FEA) is a tool commonly used by engineers when designing parts and systems using CAD software. FEA tests the mechanical properties of computer-designed parts so that they can be modified if they don't meet the required specifications.

One of the limitations of FEA is that it uses an approximated version of the computer-modeled part that tends to be blockier than the actual design. This allows FEA to break it up into small elements, which are connected together in the form of a mesh and individually analyzed. Curved surfaces do not easily break up. As a result, the approximations may be quite far off.

The Invention

UW-Madison researchers have developed a new method for creating a CAD-compatible mesh during an isogeometric analysis process. Unlike existing techniques, the method creates meshes without any approximation and delivers optimal convergence rates.

In essence, the researchers have developed a smoothing step that prevents inconsistencies from being introduced into the meshing process as a geometric map of the object is being refined.

Applications

- Implementation in CAD/FEA software

Key Benefits

- Avoids approximation issues
- Achieves optimal convergence
- Automatic

Stage of Development

The researchers have written test algorithms.

Tech Fields

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