Estimating the Effect of Large Design Changes on Previously Computed Engineering Simulation Results

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Inventors: Krishnan Suresh, Sankara Hari Gopalakrishnan

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an efficient software modeling tool for prototype testing.

Overview

Virtual testing of a 3-D solid model is a time consuming part of product design before manufacturing. Engineers often use a software modeling tool called Finite Element Analysis (FEA) to speed up the process. A grid of nodes—called a mesh—that represent important features provides a representation of the product for virtual testing. However, any design changes that are incorporated require the entire mesh to be recreated.

The Invention

UW-Madison researchers have developed a method for modeling products that does not require re-meshing. Previous simulation results are used to estimate the effect of design changes. The result is a swift but accurate estimation of design changes on product performance.

Applications

- Analysis of stress, buckling, thermal change, fatigue, fluid dynamics, simulated motion and vibration

Key Benefits

- Provides an efficient software modeling tool for prototype testing
- Allows users to test multiple design solutions in parallel
- Design changes may be analyzed without repeating entire analysis
- More widely applicable than current FEA methods
- Applies adjoint theory
- Allows exploration of many alternative designs
- Bypasses re-meshing
- Can provide cost estimation for machined parts

Additional Information

For More Information About the Inventors
- Krishnan Suresh

Tech Fields

- [Information Technology : Computing methods, software & machine learning](#)

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842