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Applying Parametric Studies in Inventor Stress Analysis

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About the speaker

Eric Schubert

With over 13 years of experience supporting, and training users on Autodesk products, Eric's background lies in engineering, project management, thixomolding and injection molding.

Currently serving as subject matter expert for D3 Technologies and their customers around Autodesk simulation products: Inventor Stress Analysis, Inventor Dynamic Simulation, Inventor Nastran, Autodesk CFD, Fusion 360, and Generative Design.

This is Eric's first presentation at Autodesk University!

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Understanding parametric studies

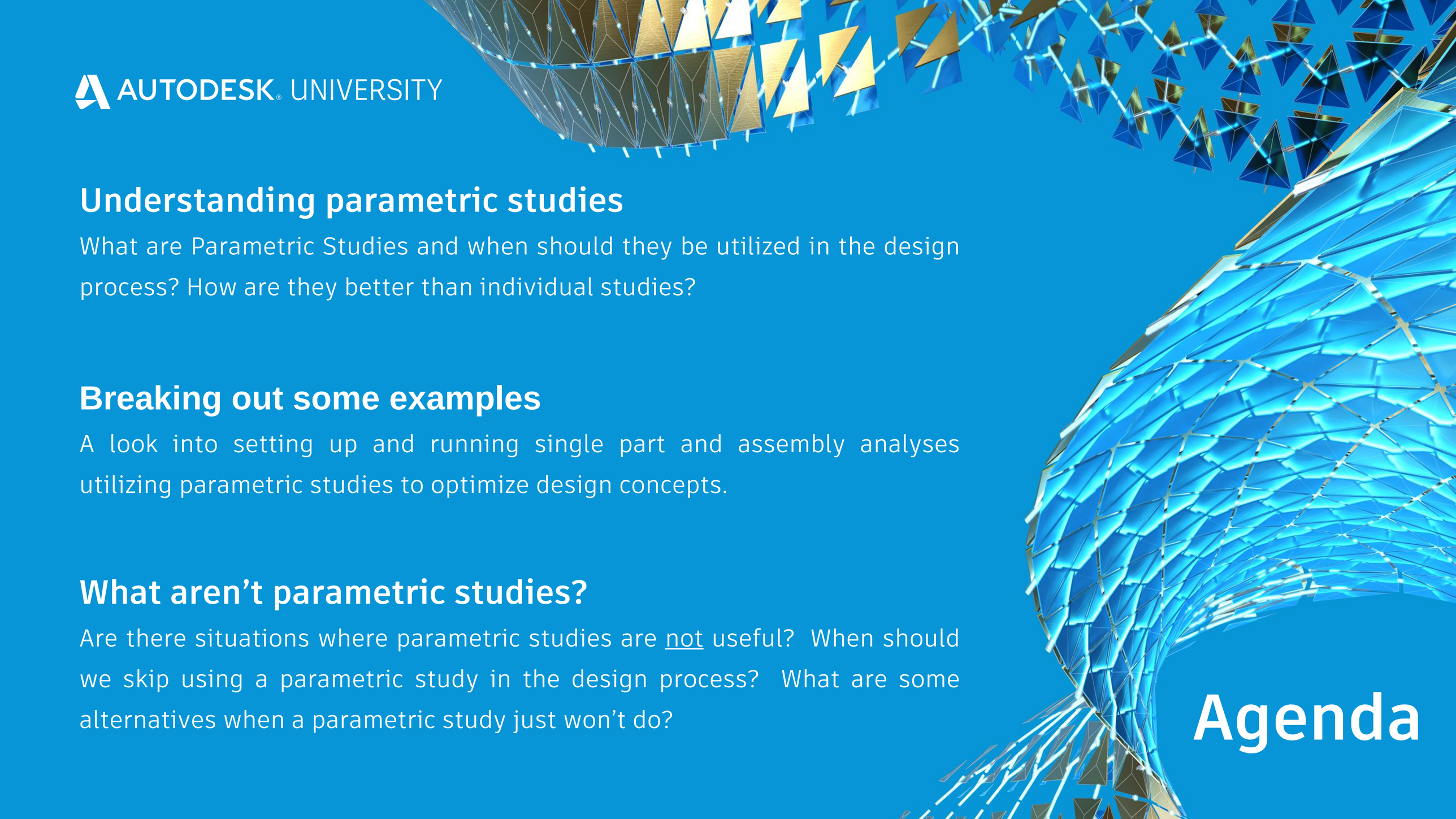
What are Parametric Studies and when should they be utilized in the design process? How are they better than individual studies?

Breaking out some examples

A look into setting up and running single part and assembly analyses utilizing parametric studies to optimize design concepts.

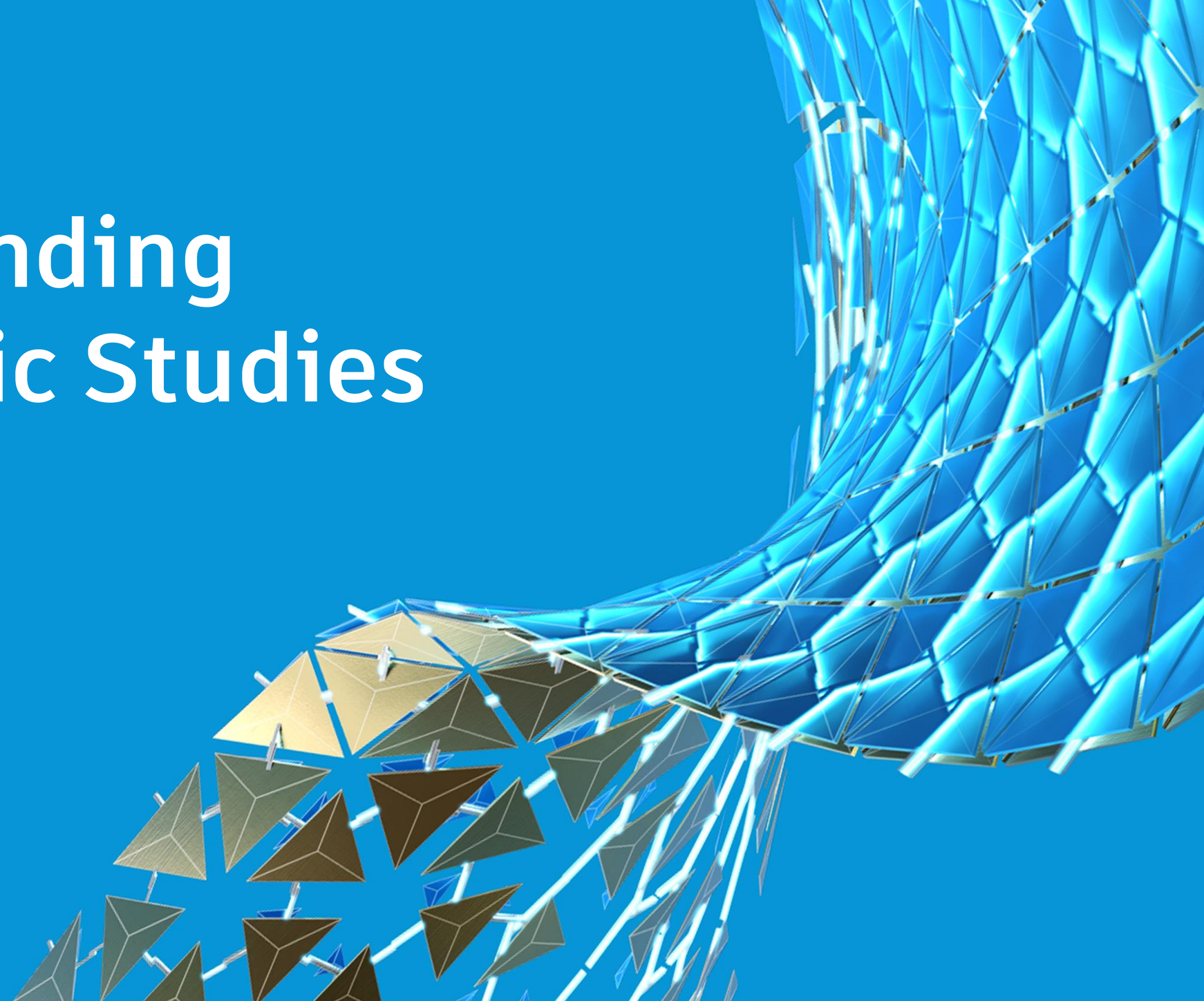
What aren't parametric studies?

Are there situations where parametric studies are not useful? When should we skip using a parametric study in the design process? What are some alternatives when a parametric study just won't do?



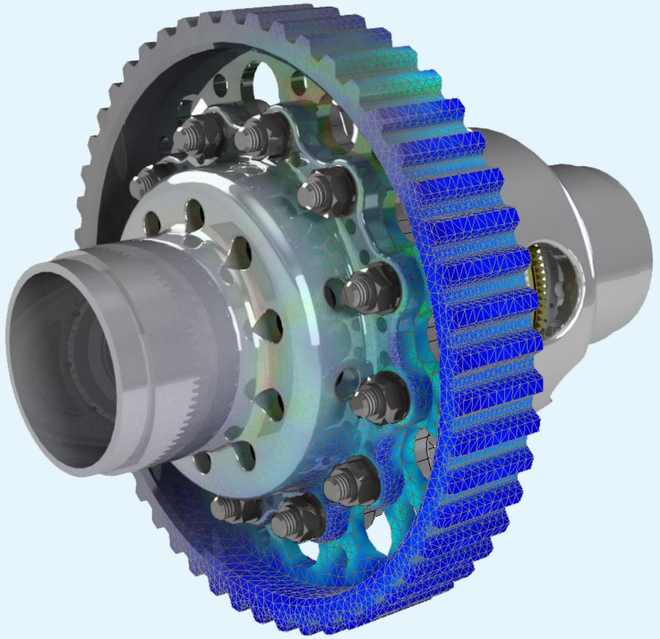
Agenda

Understanding Parametric Studies



What are Parametric Studies?

Parametric Studies allow product designers and analysts the opportunity to test and explore multiple values for a parametric model, all within a single Inventor Stress Analysis environment.



Individual Studies vs Parametric Studies

SIMILARITIES

- Can be run on both parts and assemblies
- Utilize a mesh to approximate part geometry and compute multi-part contacts
- Useful for static stress or modal analyses
- Linked with part geometry
- Solve on your local machine
- Produce full results for feasibility analysis
- Assemblies can utilize representations

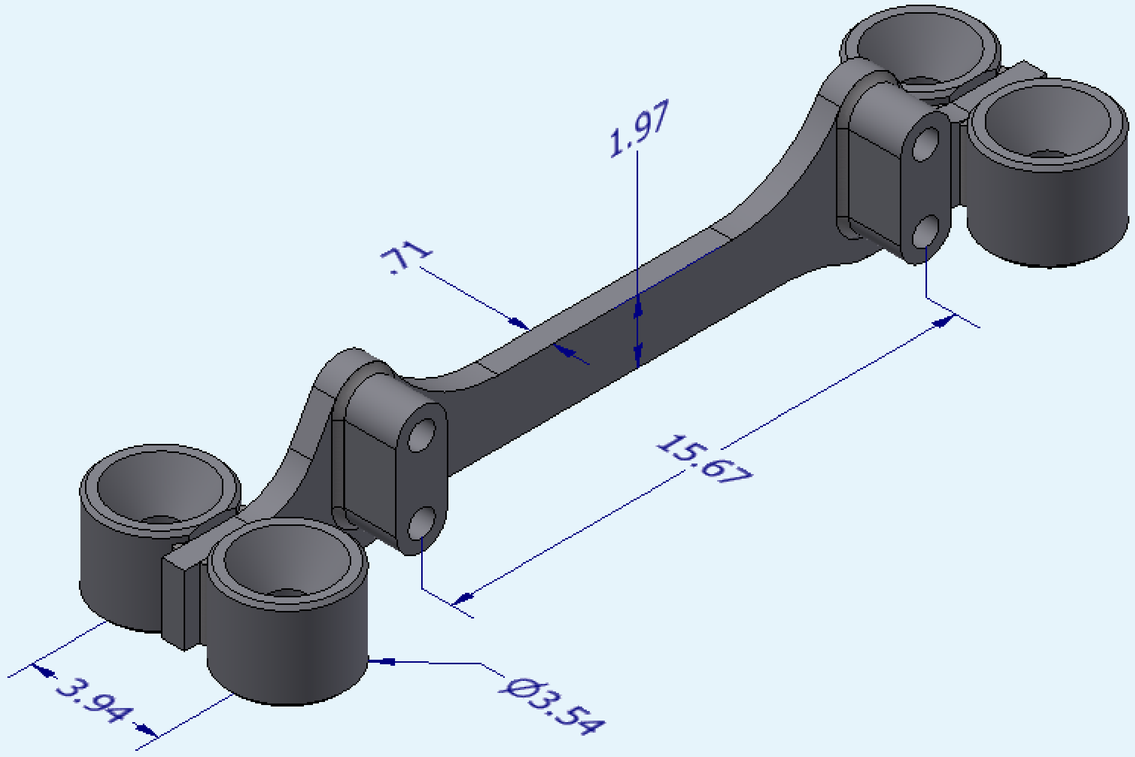
DIFFERENCES

- Import specific parameters from parts and assemblies
- Analyze multiple parameter values or combinations
- Easily compare multiple parameters in a single analysis
- Can have different mesh sizes for individual studies
- Utilize identical mesh for Parametric Studies

Type of Parameters

What types of parameters can be included in Parametric Studies?

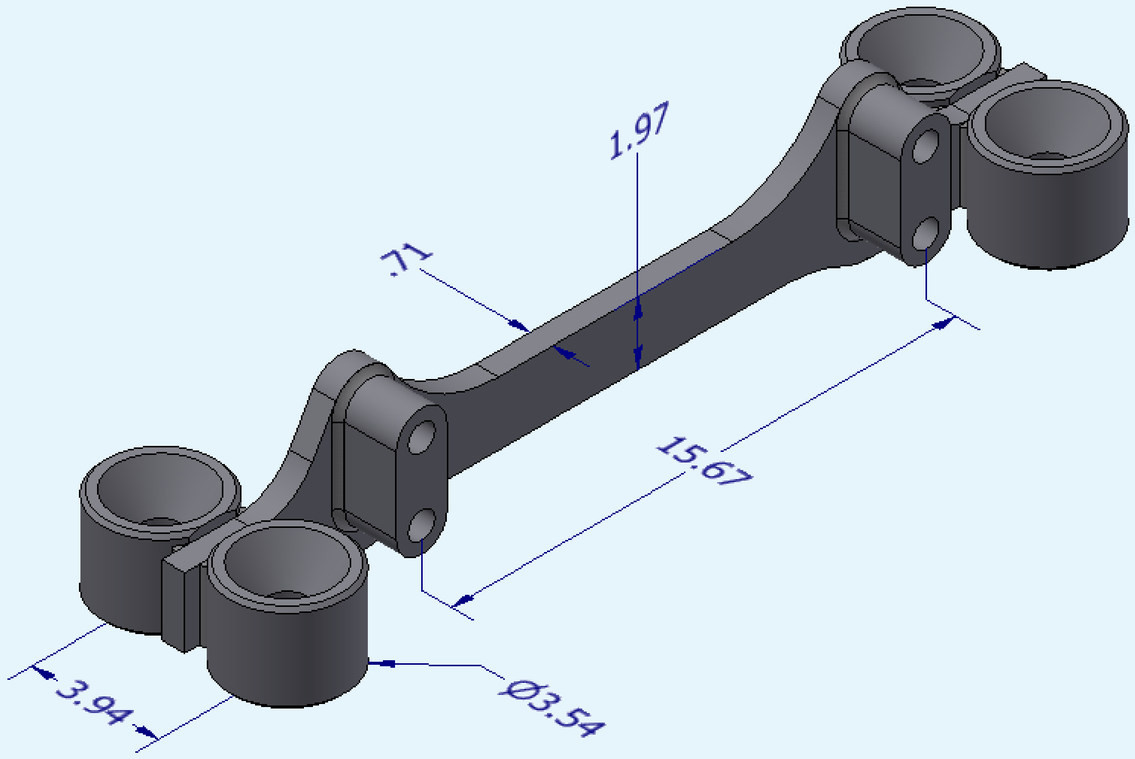
- **Sketch Dimensions**
- **Feature Dimensions**
- **Work Feature Dimensions**
- **Assembly Constraints**
  - Offset Values (Mate, Flush, Insert, etc.)
  - Angle Values
- **User Parameters that drive a design**



Type of Parameters

What types of parameters <u>can’t</u> be included in Parametric Studies?

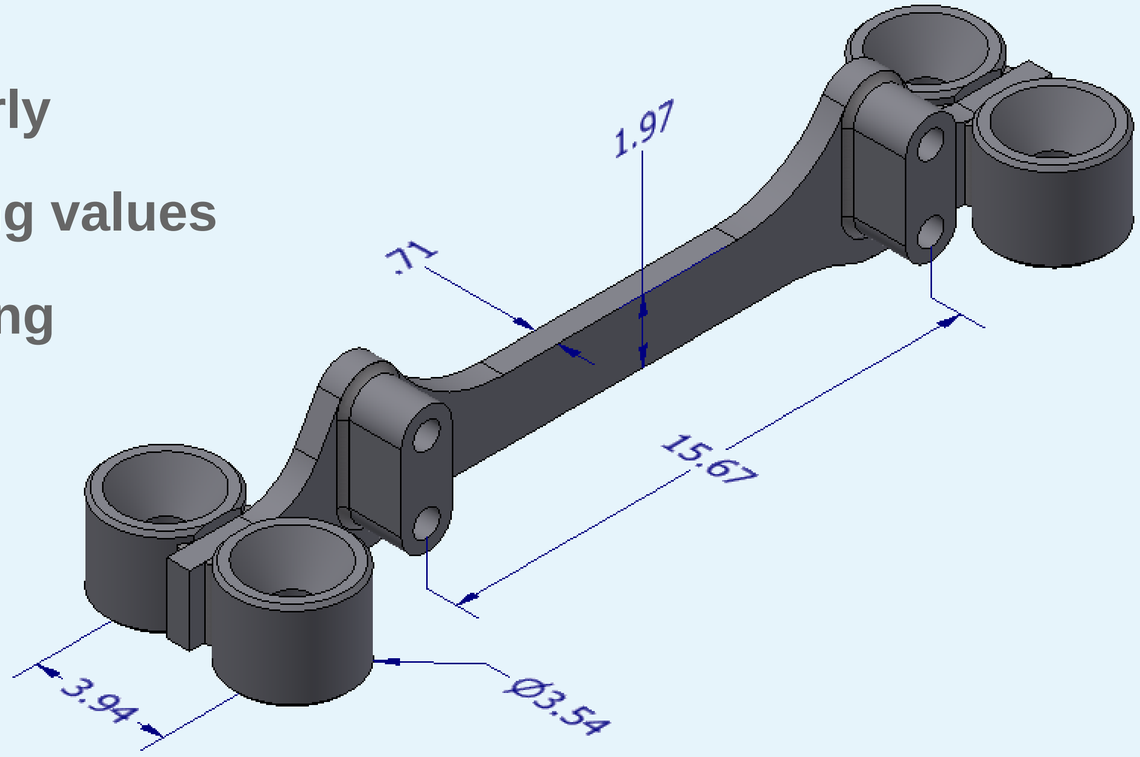
- **Read-only parameters (within Inventor)**
  - Spreadsheet-driven
- **Unavailable parameters**
  - Derived parts



Type of Parameters

TEST YOUR PARAMETERS!!!

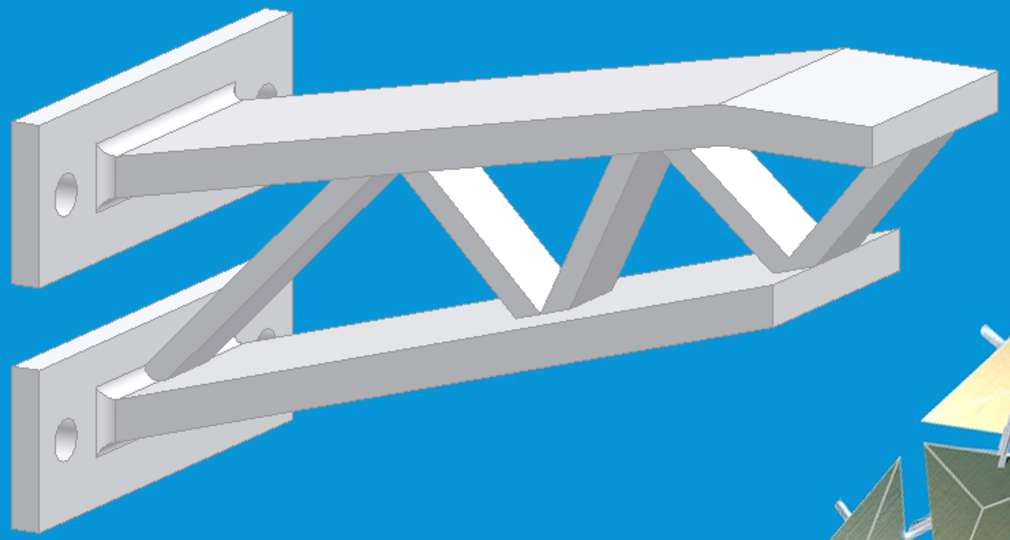
- **Verify your parameters will adjust properly**
- **Check for errors when manually changing values**
- **Test various combinations prior to starting**
- **Requires a robust model**

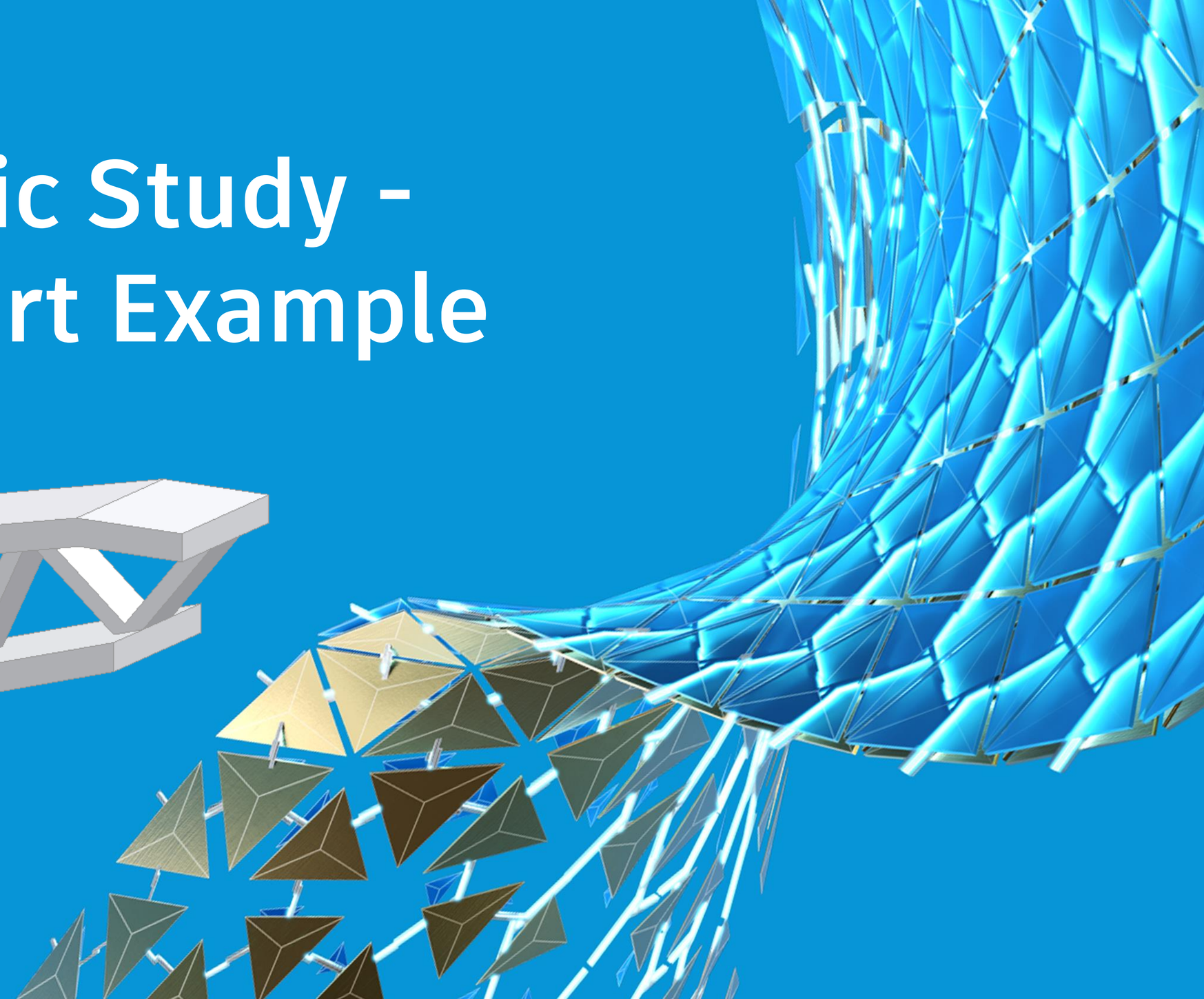


When are Parametric Studies best utilized?

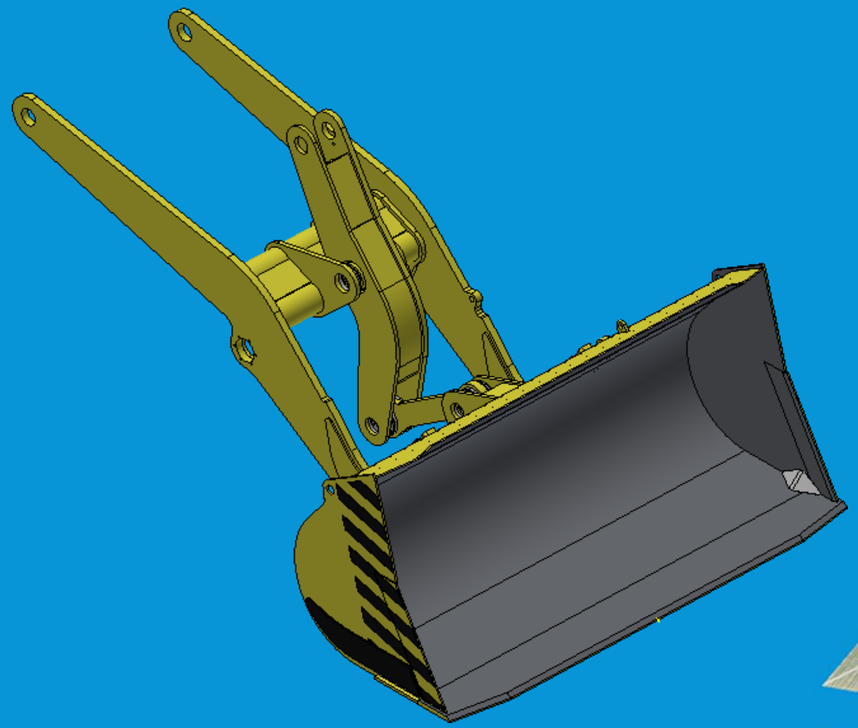
- **Early on in the design process**
- **Design parameters are still fluid**
- **Limited number of parameters to explore**
- **Optimization highly-desirable**

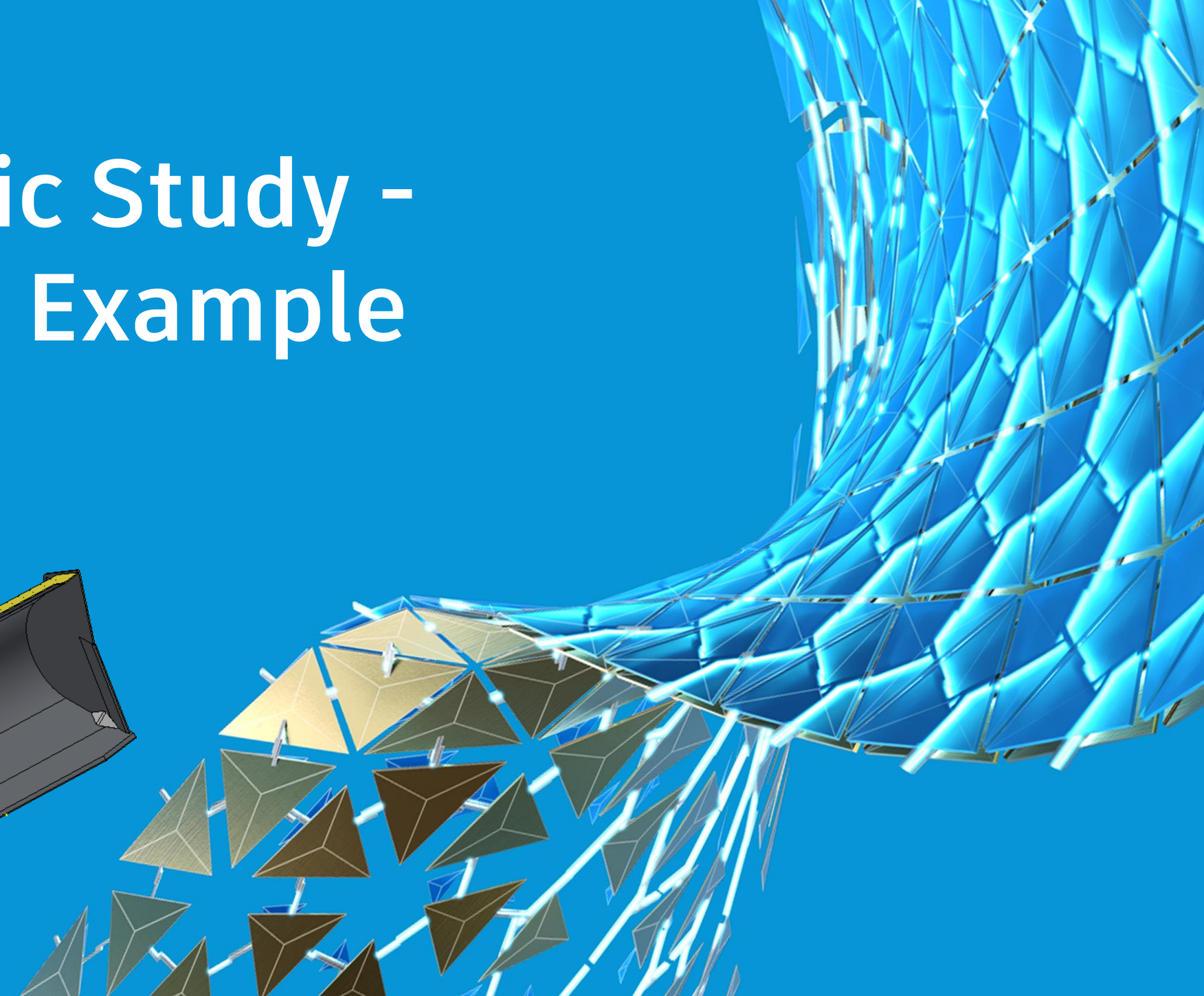
Parametric Study - Single-Part Example





Parametric Study - Assembly Example





Summary

What are Parametric Studies?

Parametric Studies are a subset of Inventor Professional's Stress Analysis studies, designed to help designers and engineers explore multiple parameter choices early on in the design process.

Summary

What parameters can be included?

Virtually all editable parameter values, both in parts and assemblies, can be utilized in a Parametric Study.

Questions?

For questions, please attend one of the live Q&A sessions scheduled throughout Autodesk University 2020

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