AUTODESK® UNIVERSITY

Product Design & Manufacturing Collection. Autodesk’s Digital Strategy & what's in the box

Dave Wilkinson

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About the speaker

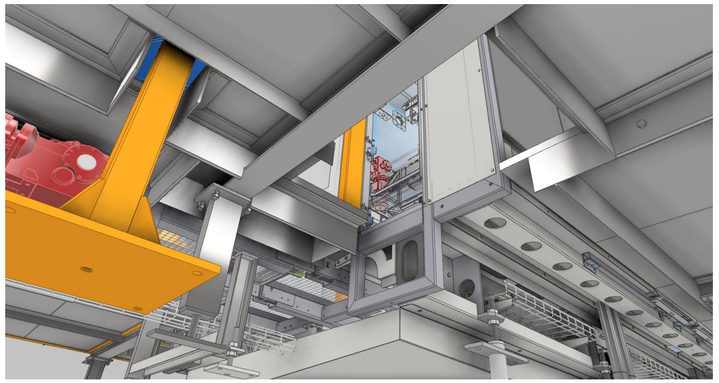
Dave Wilkinson

I joined Autodesk in 2015 following 10 years working in the reseller channel, primarily within manufacturing. Prior to this I worked within Manufacturing as a machinist and CAD manager.

I have a wide range of interests outside of the CAD world usually involving outdoor pursuits from expedition photography to building canoes, campervans and anything else involving being outdoors and making things.

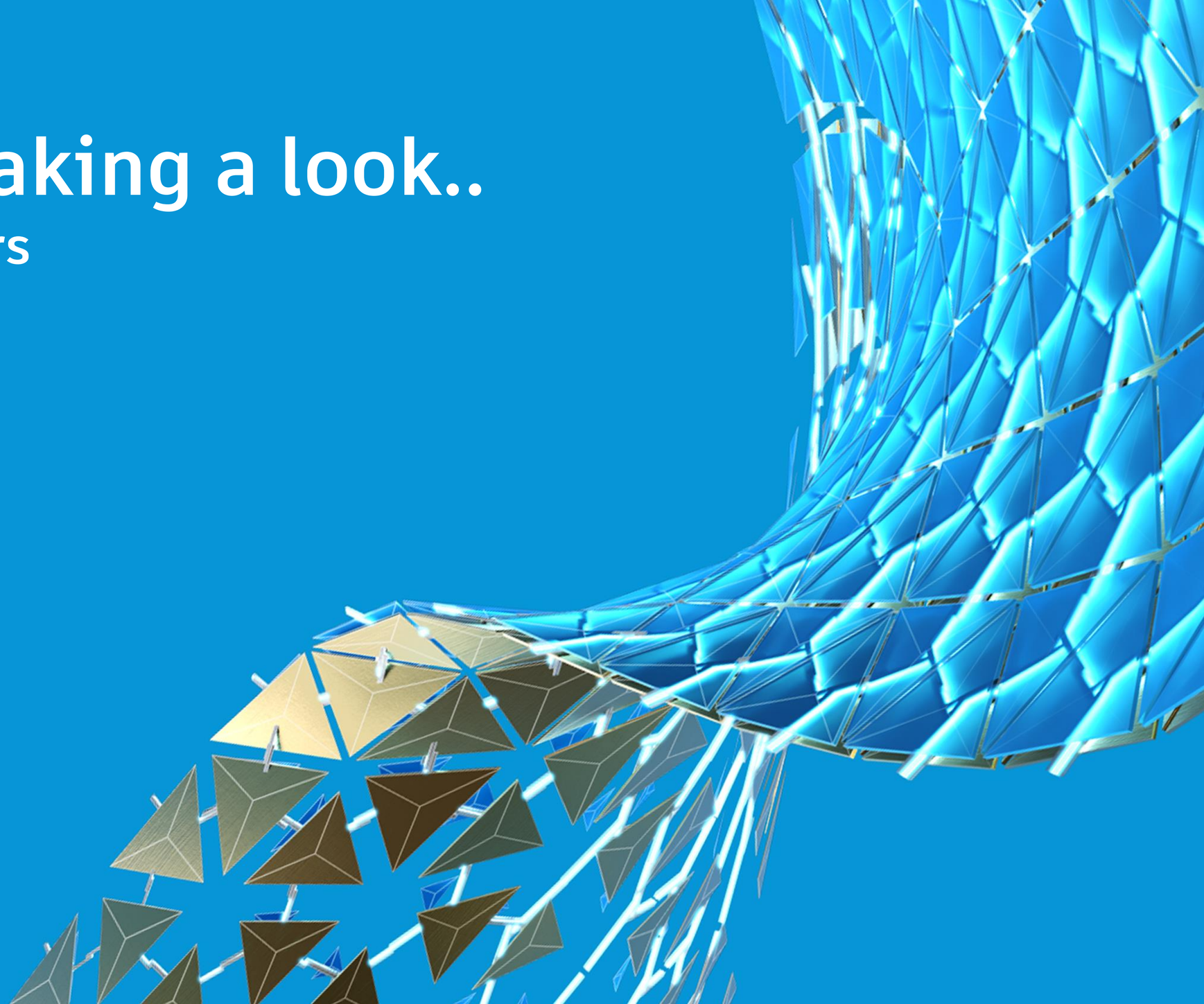
Product Design & Manufacturing Collection: Autodesks Digital Strategy and What’s in the Box

In this class, we'll look at how you can utilize core features and functionality within Inventor software and apply that within your design tasks. I’m not intended the class to be a what’s new or latest and greatest of Inventor presentation, but rather a refresher and more importantly a reminder of core topics focusing on Design Accelerators, Frame Generator, iLogic automation, Stress Analysis, and Tube and Pipe capability.



Let’s start taking a look..

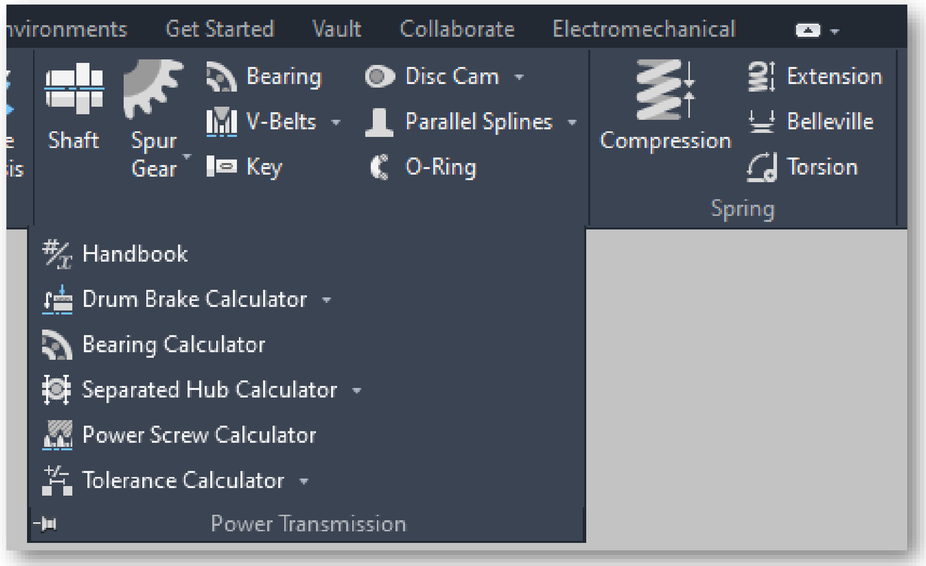
Design Accelerators



What are Design Accelerators ?

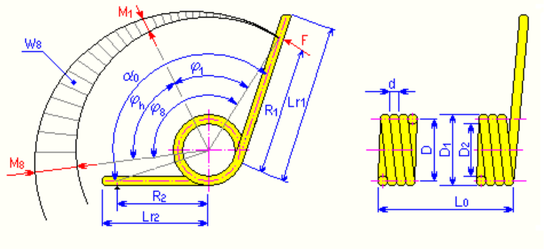
Autodesk Inventors Design Accelerators are an important component of Functional Design. Design Accelerators give an array of Engineering calculations to support and validate engineering choices. Not only that, depending upon design task, they will generate the 3D content for you.

- Engineers Handbook
- Bolted Connections
- Shaft Generator



About Torsion Springs

Torsion springs have at least one and a half coils. A torsion spring is exposed to external forces acting in pl carried by the working and the supporting arms. Active coils change their diameter during the function.



Dimensions

d	wire diameter [mm, in]
D	mean spring diameter [mm, in]
D_1	outside spring diameter [mm, in]
L_0	length of coiled spring part for free spring state, in general [mm, in]
R_1	arm of working force induced by the spring [mm, in]
R_2	arm of support force induced by the spring [mm, in]
M_1	torque induced by the pre loaded spring [Nm, lb ft]
M_8	torque induced by the fully loaded spring [Nm, lb ft]
W_8	deformation energy induced by the fully loaded spring [J, ft lb]

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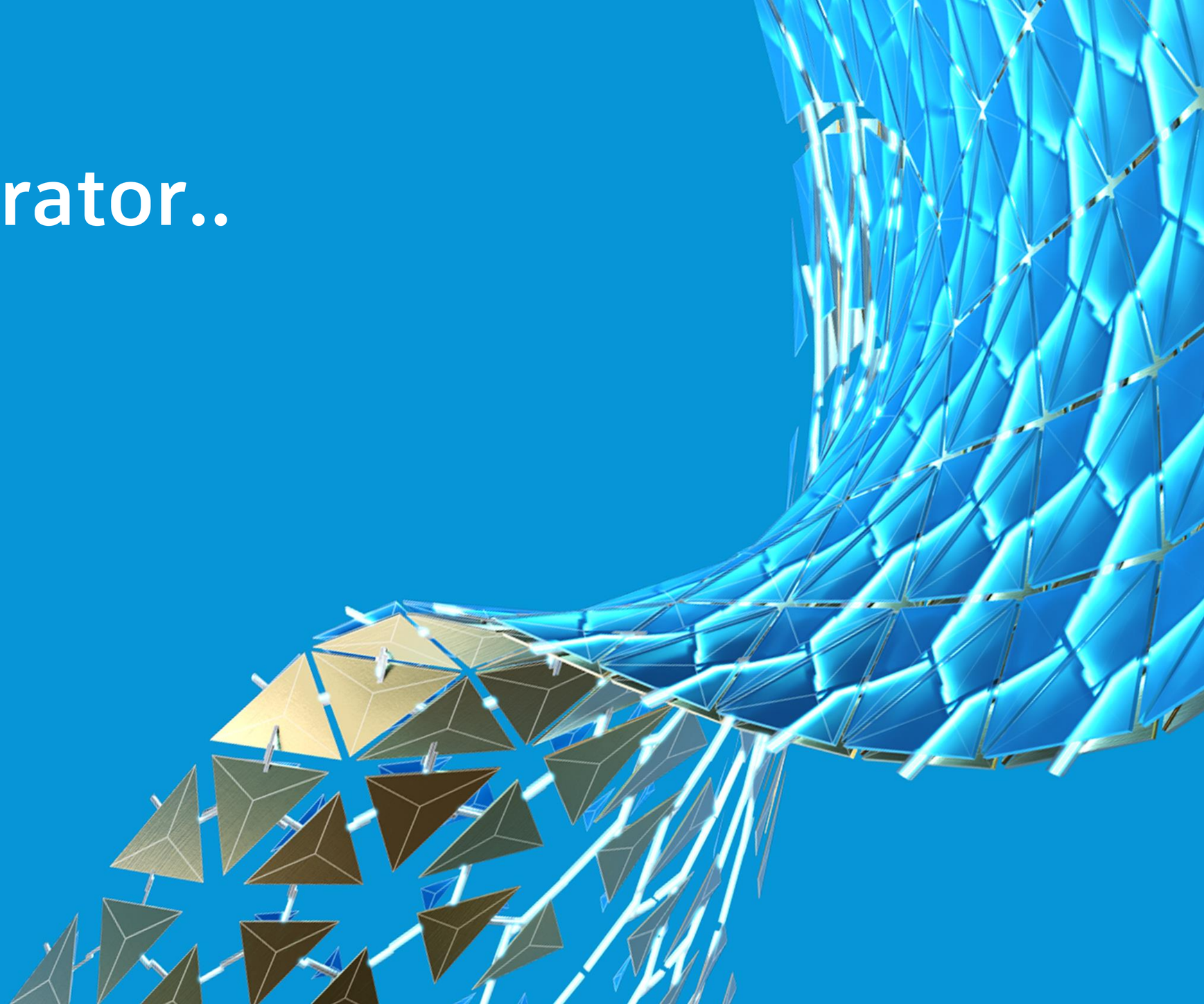
Frame Generator..



Frame Generator…?

Create internal frame and external frame assemblies for machines from the assembly and weldment environments.

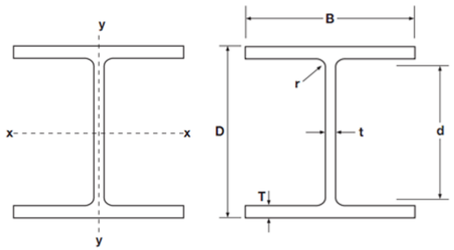
Use Frame Generator to create internal frame and external frame assemblies for machines. Frame Generator is available in the assembly and weldment environments.

- **What can I do with Frame Generator?**
  - Create frame members from vertices and edges of existing subassemblies.
  - Build framing directly from other machine components within an assembly.
  - Use multiple skeletal models in an assembly.
  - Create frame members between skeletal models.
  - Define frame end caps, cross-sections, and notch profiles and place them in the Content Center

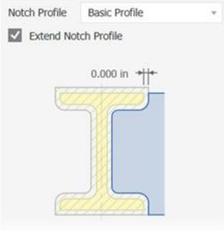
Using Frame Generator

We would typically use a Skeleton Sketch or simple volume, or object to define frame members. But we can also use exiting assembly geometry as well.

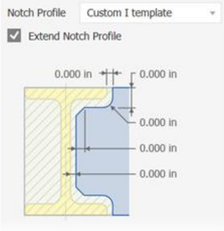
- [Frame Generator]
- [Using End Caps]
- [Authoring your own sections]



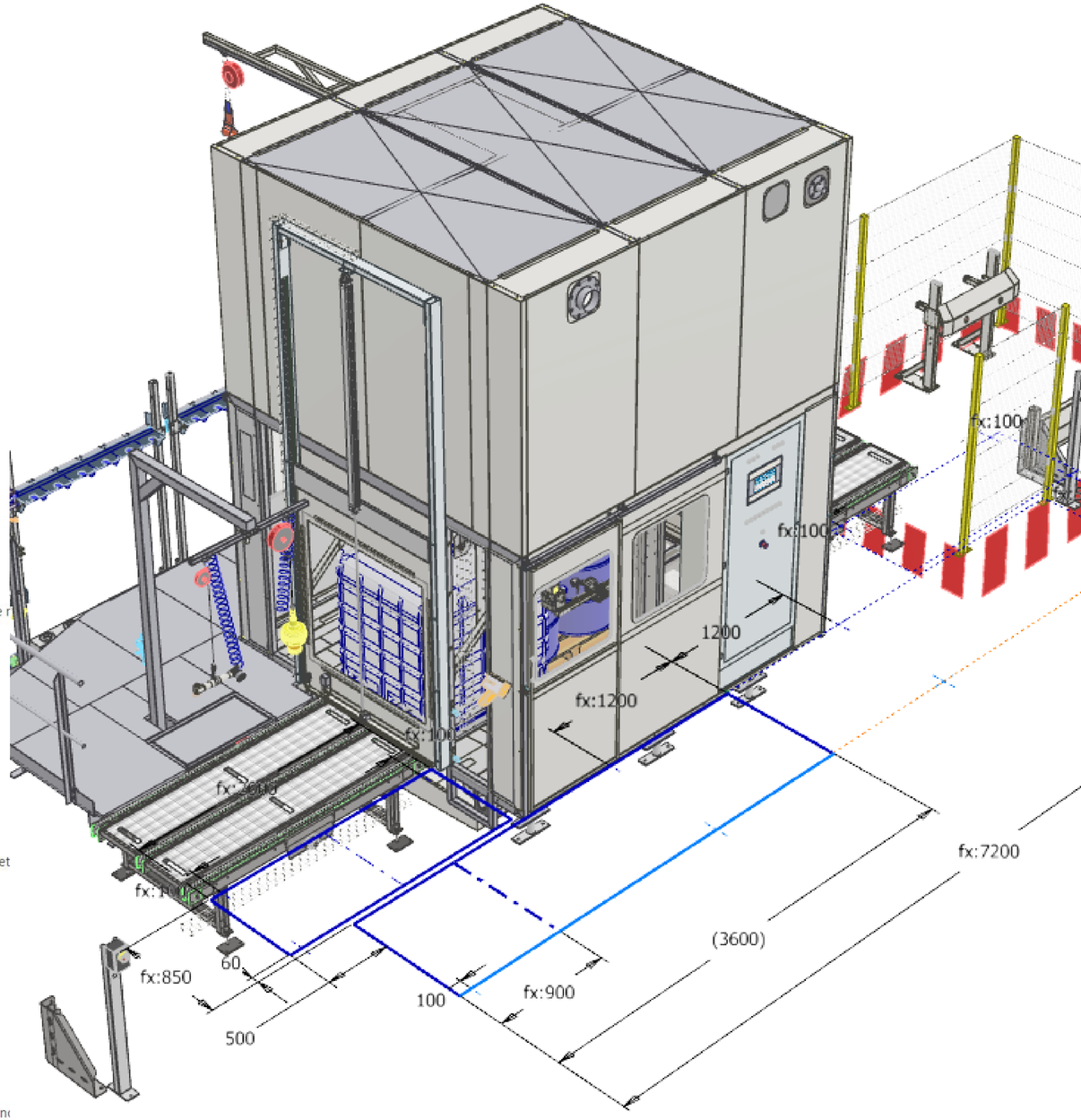
- Basic Profile to set a single offset value for the r



- Custom I, Custom C, or Custom T template to set



- Custom Profile, if available, to use the custom n



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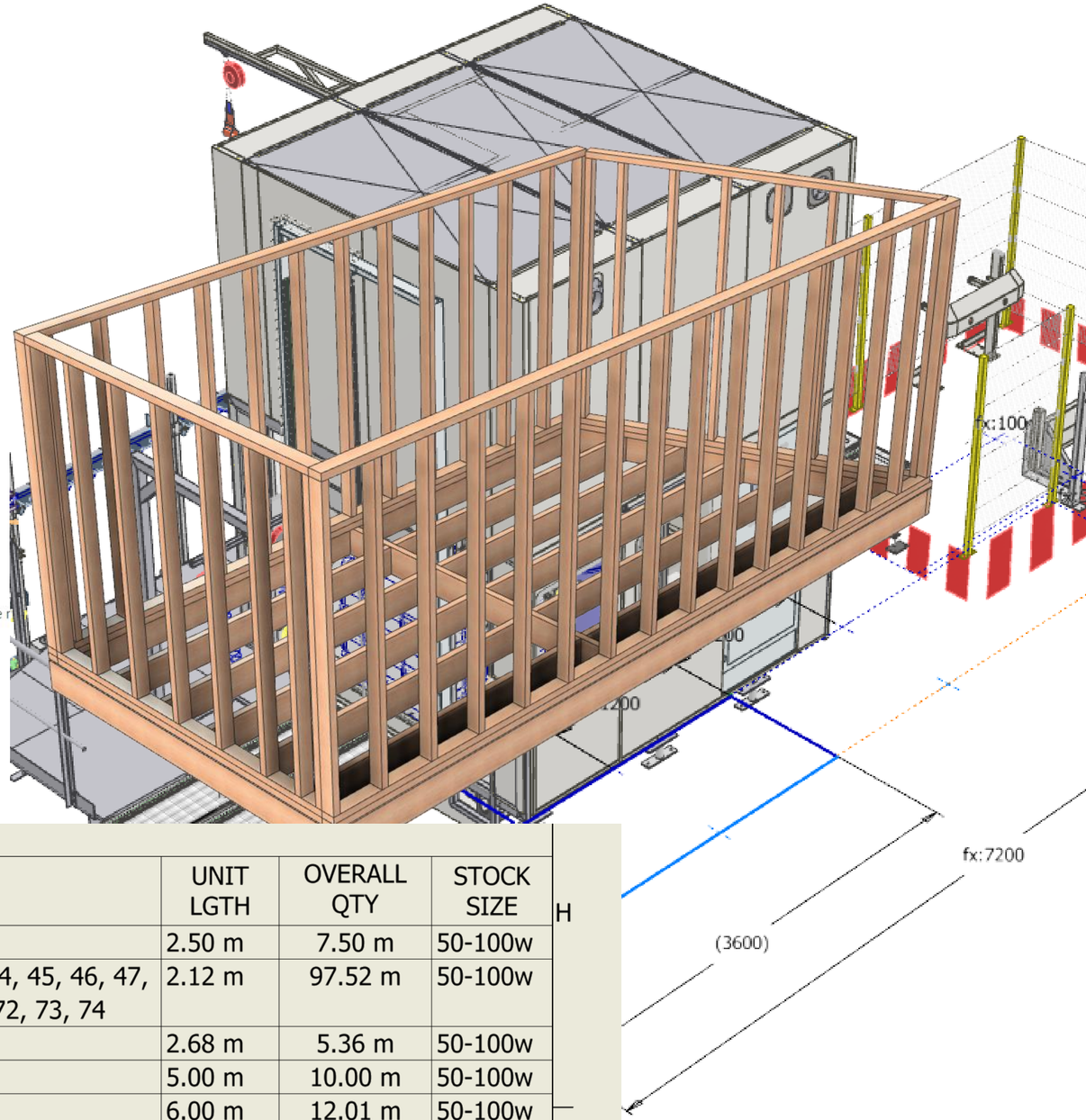
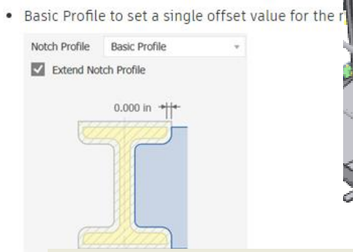
Using Frame Generator

We would typically use a Skeleton Sketch or simple volume, or object to define frame members. But we can also use exiting assembly geometry as well.

Its doesn't have to be steel frames...

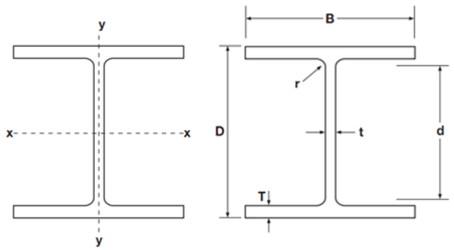
- [Frame Generator]
- [Using End Caps]
- [Authoring your own sections]





PARTS LIST

	UNIT LGTH	OVERALL QTY	STOCK SIZE
	2.50 m	7.50 m	50-100w
7, 38, 40, 41, 42, 43, 44, 45, 46, 47, 53, 67, 68, 69, 70, 71, 72, 73, 74	2.12 m	97.52 m	50-100w
	2.68 m	5.36 m	50-100w
	5.00 m	10.00 m	50-100w
	6.00 m	12.01 m	50-100w
	2.53 m	12.63 m	50-220w
	2.70 m	2.70 m	50-220w
	5.04 m	5.04 m	50-100w
	5.94 m	5.94 m	50-220w
	2.91 m	2.91 m	50-220w



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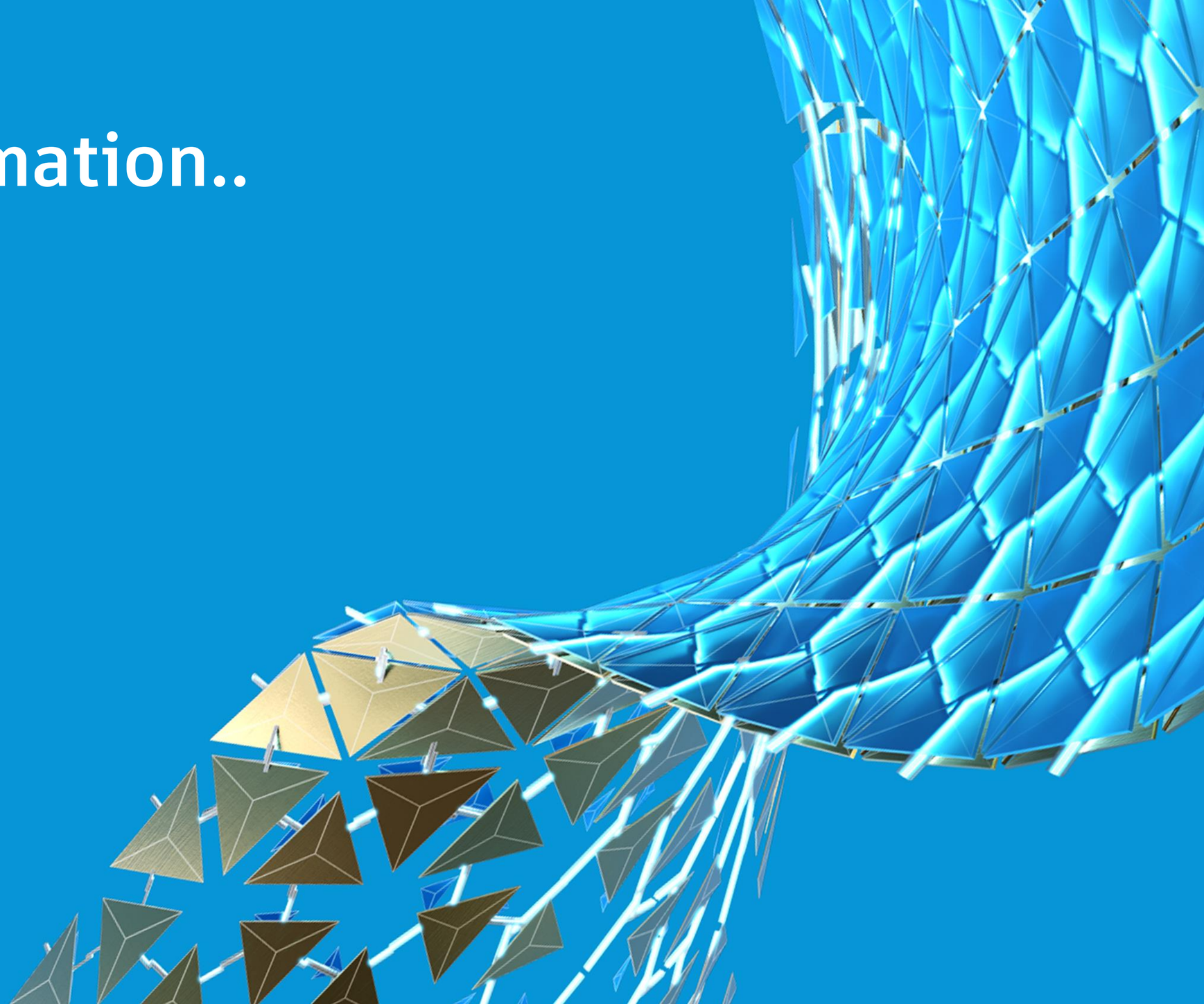
Design Automation..
iLogic



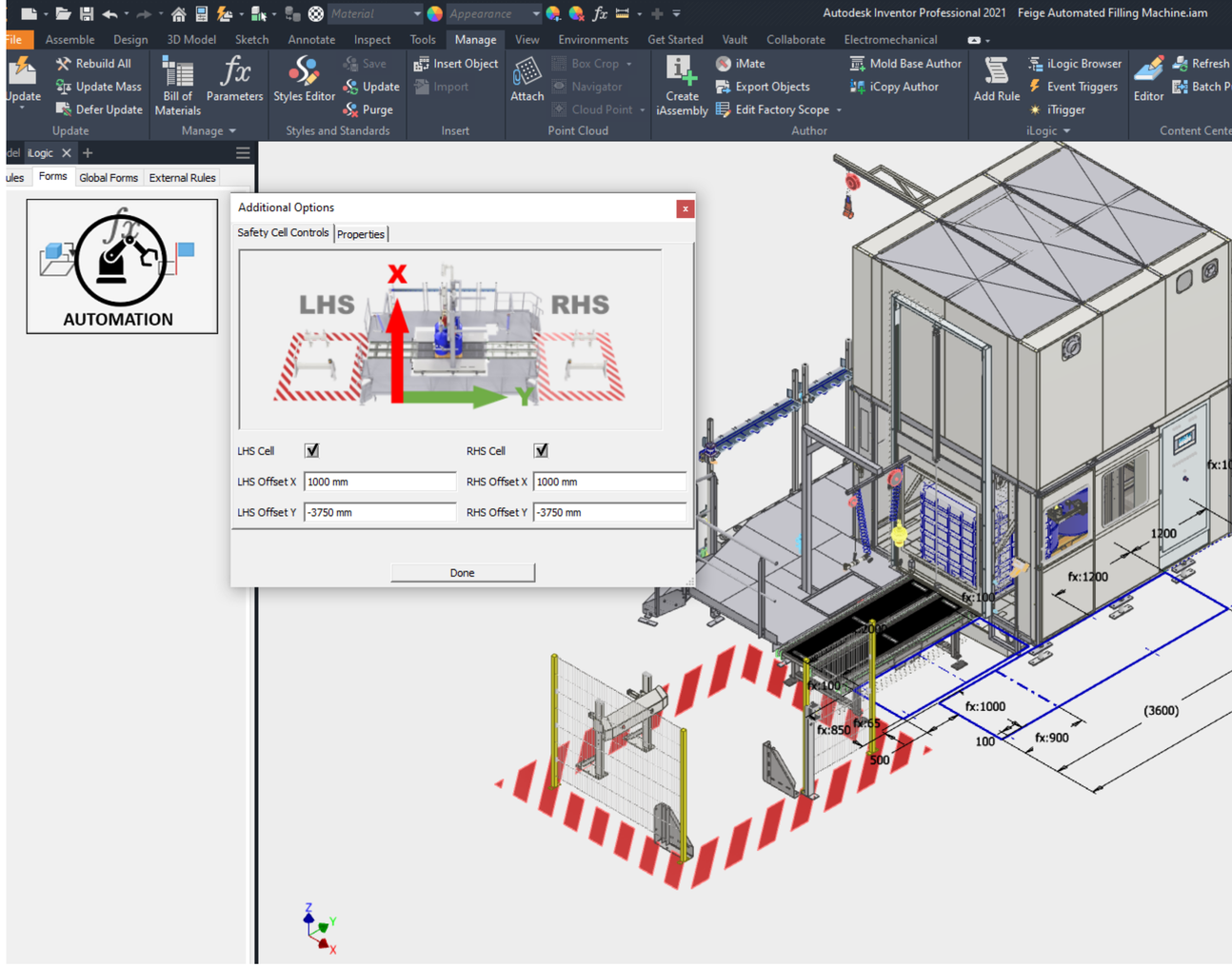
iLogic…..

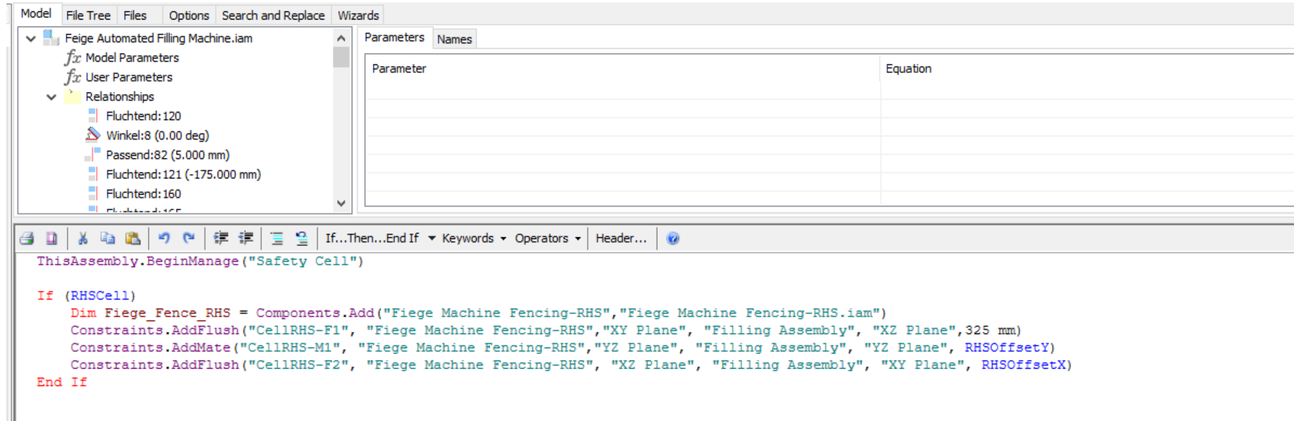
What is iLogic, and what does it enable you to do..?

Have you heard of Design Automation? Capturing variants of your product and making them [easily](#) configurable!

iLogic enables rules-driven design, providing a simple way to capture and reuse your work. Use iLogic to standardise and automate design processes and configure your virtual products.

- **Simple configurations or parameter changes**
- **Complex logic rules to configure designs**
- **Mass Customisation**





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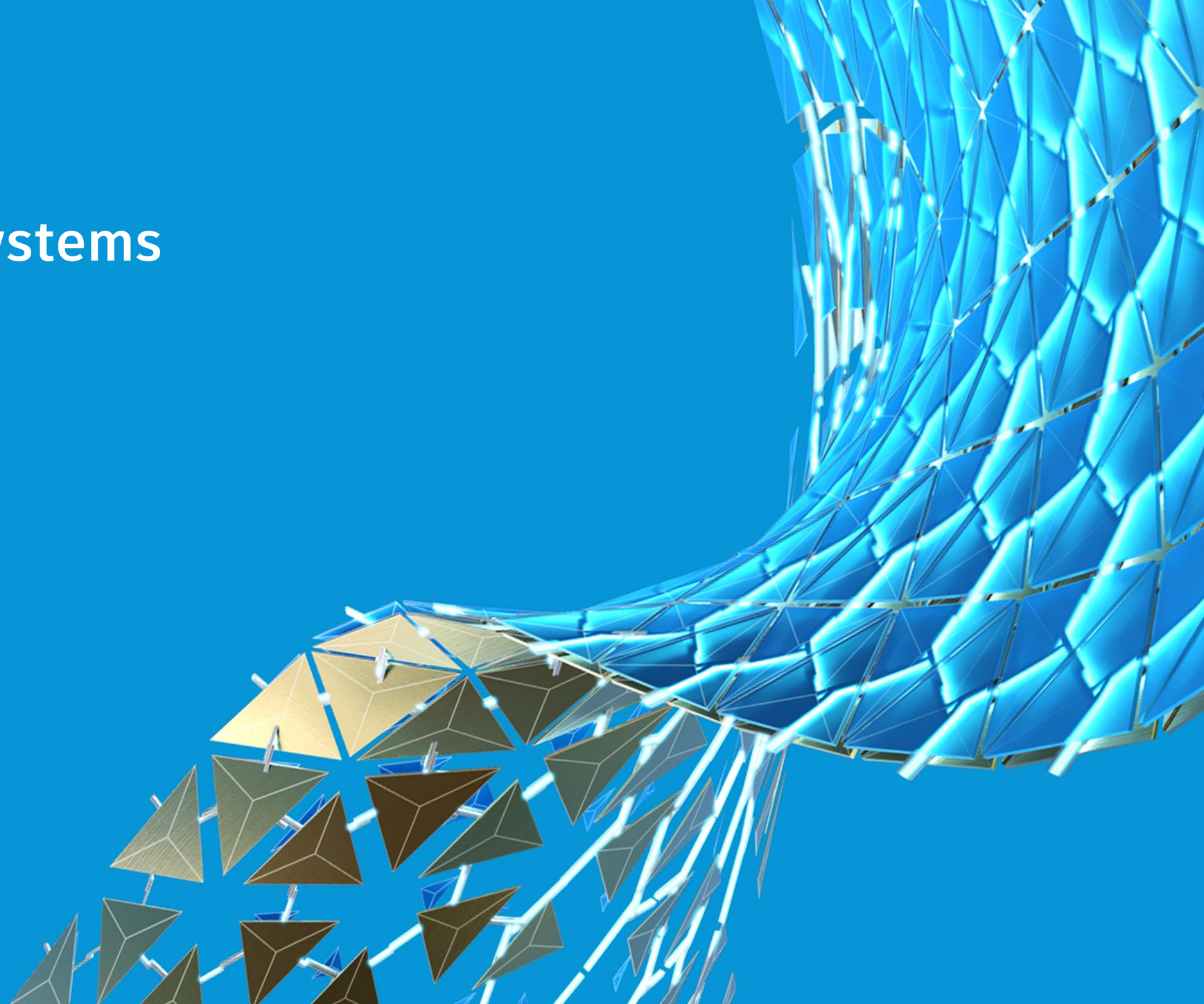
Tube & Pipe

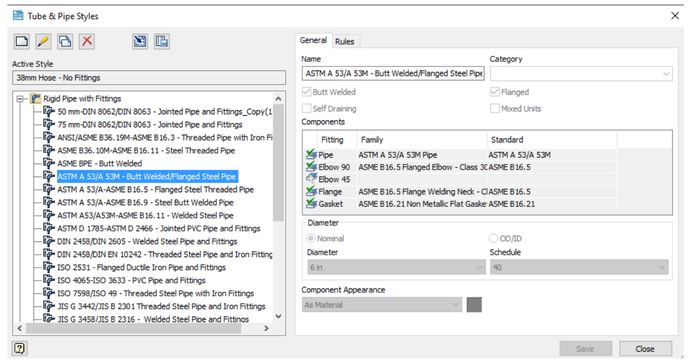
Part of Routed systems

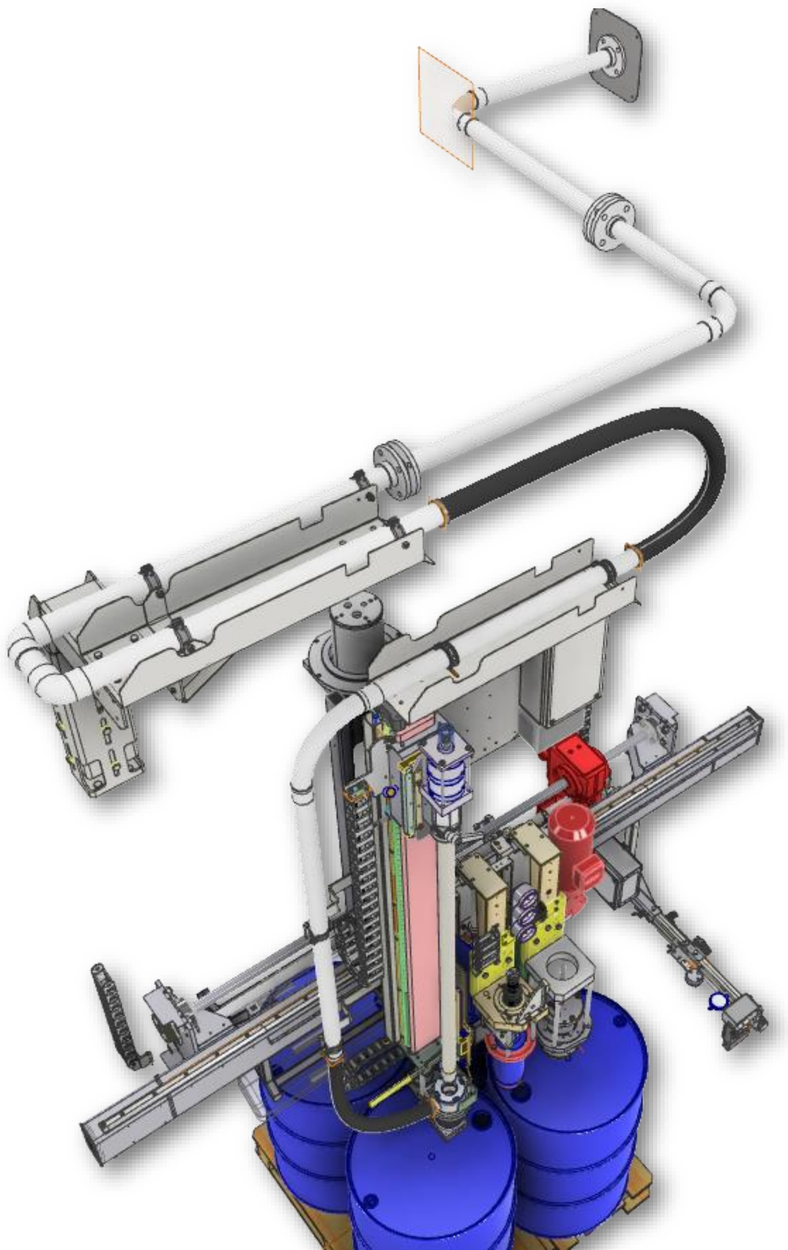


Tube & Pipe

Autodesk Inventor Tube & Pipe is an add-in to the assembly environment. It adds design tools for routing rigid pipes, bent tubes, and flexible hoses to mechanical assemblies or product designs in the assembly environment.

- [Tube & Pipe environment]
- [Rigid & Flexible Pipe runs]
- [Styles based pipe routing]





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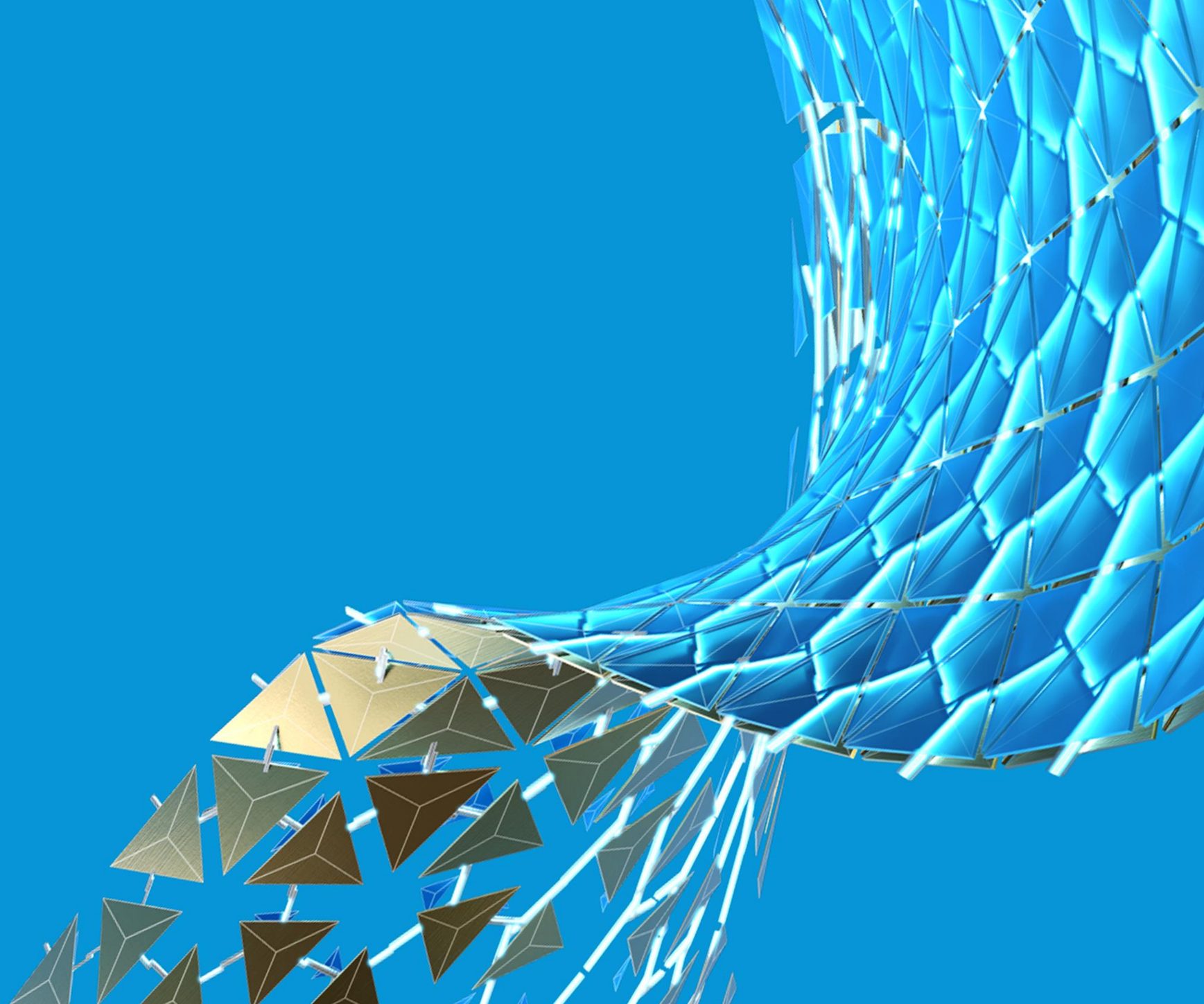
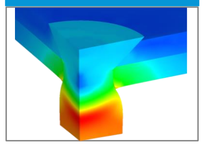
Simulation

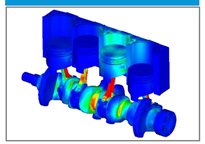


Simulation…It’s a big topic !

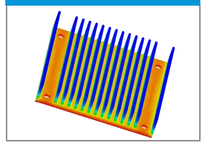
Nonlinear Statics



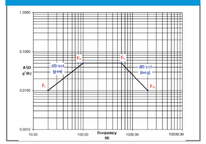
Nonlinear Transient Heat Transfer



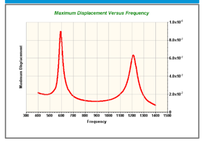
Nonlinear Steady State Heat Transfer



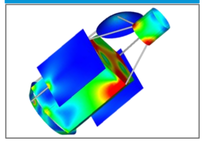
Random Response



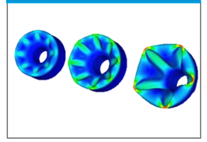
Frequency Response



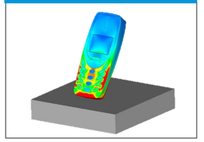
Linear and Nonlinear Transient Response



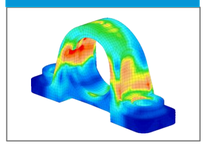
Various nonlinear and Hyper-elastic Materials



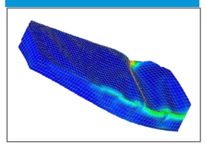
Automated Impact Analysis (AIA) and Drop Test



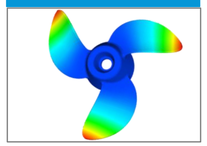
Linear Statics



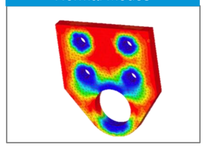
Buckling



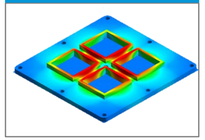
Normal Modes



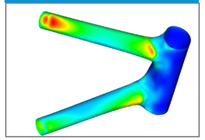
Pre-stress Static and Normal Modes



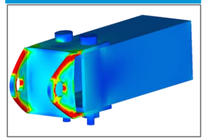
Linear Steady State Heat Transfer



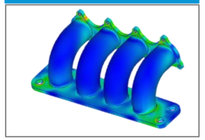
Composites



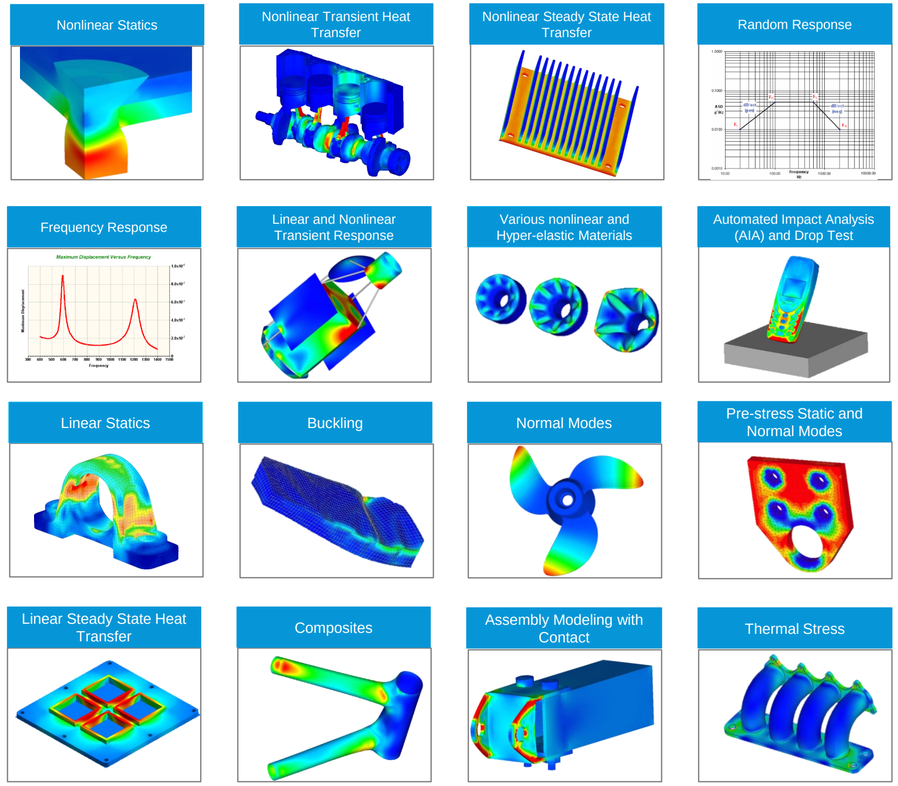
Assembly Modeling with Contact



Thermal Stress



Simulation…It’s a big topic !



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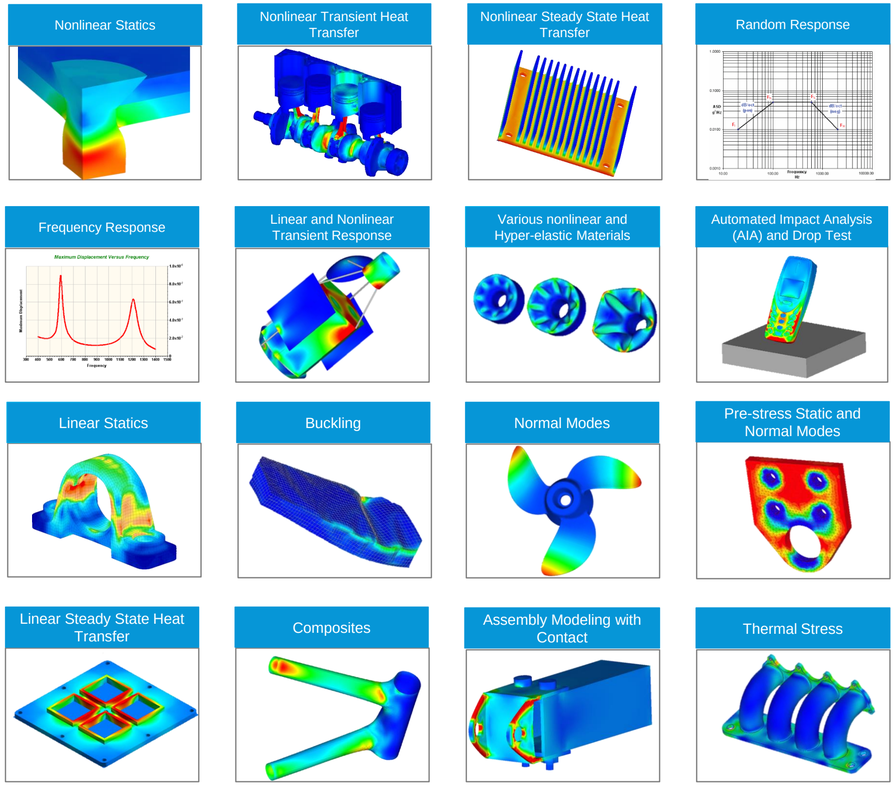
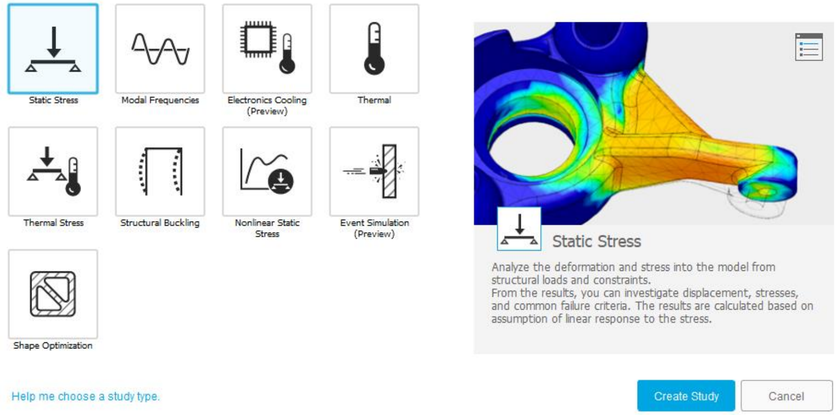
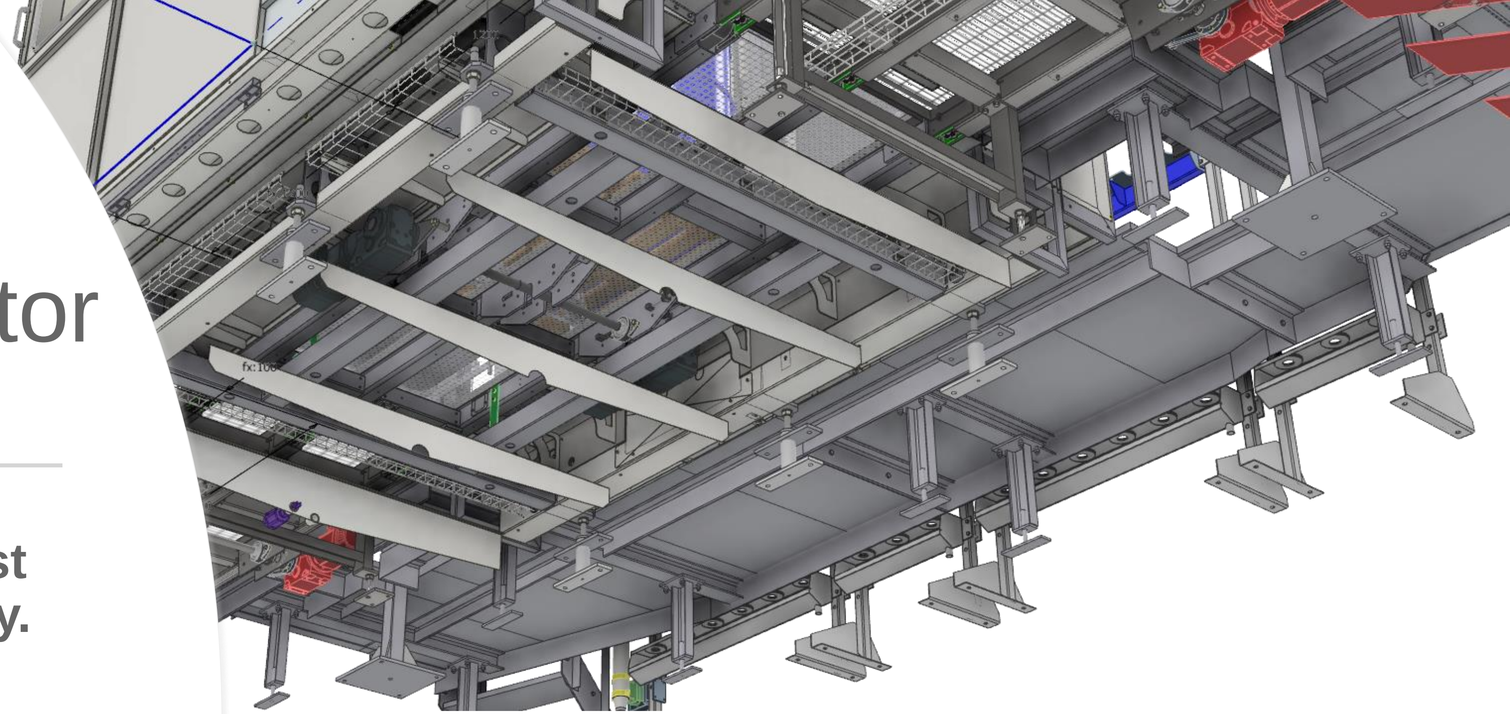
Simulation…It’s a big topic !





Simulation - Core Inventor



Stress analysis can help you find the best design alternatives for a part or assembly. Early in design development, you can ensure that a design performs satisfactorily under expected use without breaking or deforming.

- Static Analysis evaluates structural loading conditions
- Modal Analysis evaluates natural frequency modes, including rigid body movements

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Summary

- **Design Accelerators**
- Design Automation with **iLogic**
- Routed Systems – **Tube & Pipe**
- Simulation – **Inventor Stress Analysis**

Inventor is AWESOME…

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