# Total Solution for Structural Optimization "OPTISHAPE-TS"

NewtonWorks

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## - Overview -

Structural optimization is the process of automatically shaping a design and its manufacturing to meet the designer's requirements simultaneously, such as examining the optimal initial layout, achieving both strength and weight reduction, and setting eigenvalues while taking resonance frequencies into account. It also prevents interference with other components by considering the design space.
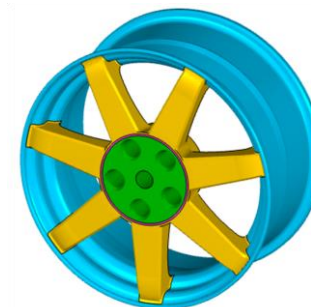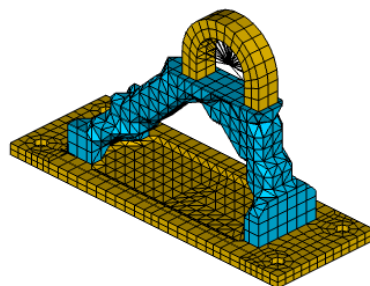
Utilizing Structural optimization can reduce significant amount of work-hours by automating trial and error during the process of altering shapes, which often requires a lot of designers' workload.
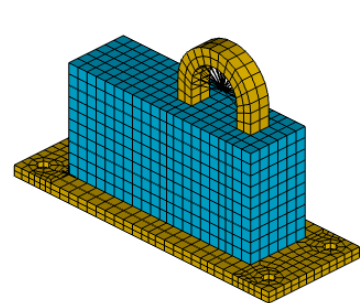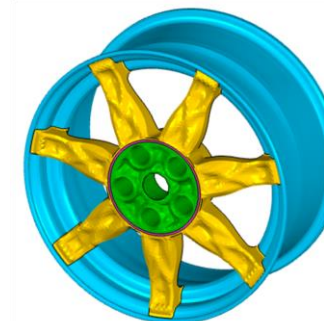


Weight reduction
Stiffness
Layout

*Arm*



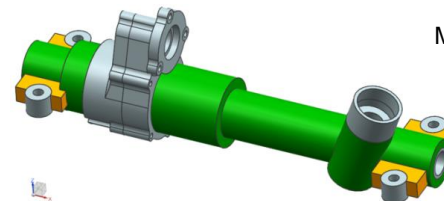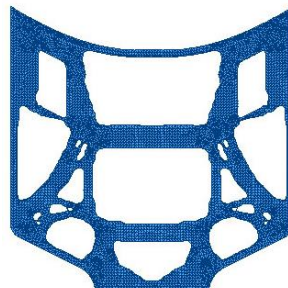Weight reduction
Eigenvalues
Stress
Design field
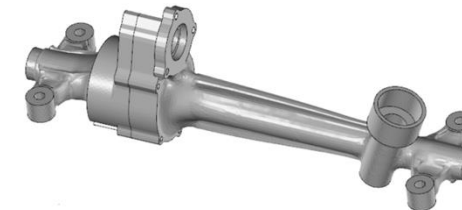
*Wheel*



Weight reduction
Multiple Stiffnesses
Layout

*Hood reinforcement*



Weight reduction
Multiple eigenvalues
Stress
Design Space

*EPS*

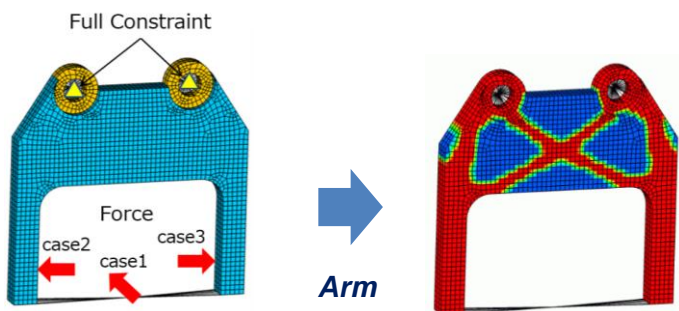NewtonWorks Corporation

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## - Functions for structural optimization -

OPTISHAPE-TS has the following three functions.

### ● Topology Optimization

- Propose a layout that fulfills the requirements within the defined design space.
- Have enough flexibility to effectively used during the early stages of product development or when making significant design changes.
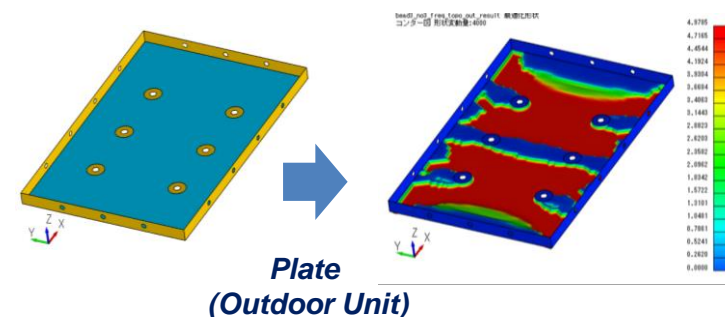
### ● Non-parametric Shape Optimization

- Propose a shape that satisfies the requirements by adjusting the nodes of the FEM model and altering the surface geometry.
- Applicable across various design stages, including detailed design and the improvement of existing components, as it can account for numerous design and manufacturing requirements.
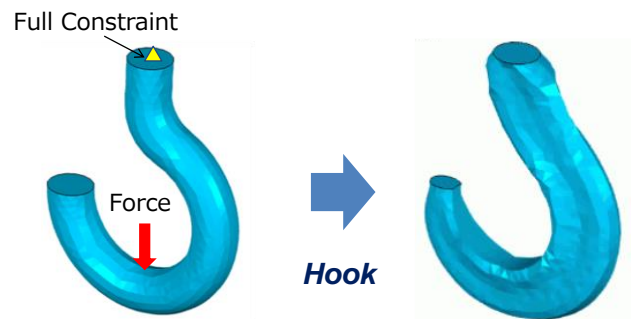
### ● Bead Optimization

- Propose a bead layout for plate-shaped components that fulfills the stiffness and strength requirements.



*Arm*



*Hook*



*Plate (Outdoor Unit)*

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## - Operational flow -

OPTISHAPE-TS performs the following sequence of steps:
1. Configure the optimization settings using a pre-post processing tool.
2. Conduct finite element (FE) analysis and optimization calculations in succession.
3. Examine various aspects of the results and compare the resulting model with the initial model using the pre-post processing tool.

Weight
Stress
Stiffness
Temperature
Others

*Input*

*Nastran Analysis Model*

**1. Optimization Settings**

**2. Finite Element Analysis and Optimization Computation**

**3. Post-processing**

Preprocessor

**OPTISHAPE-TS**