Easing Structural Optimization Tasks with
Design Studio for *GENESIS*

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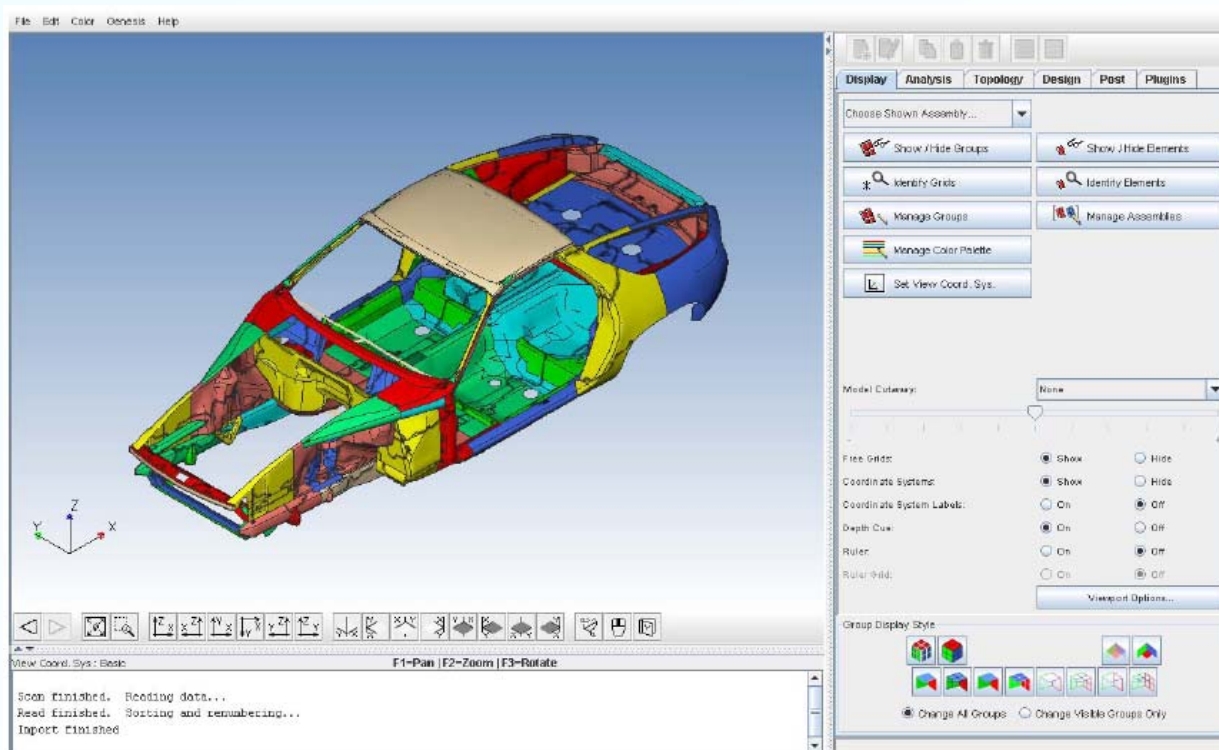
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Outline

- **Introduction**
- **Features for Creating Data**
- **Features for Editing Data**
- **Features for Post-processing Results**
- **New Features in v14.0**

- # What is Design Studio?
  - ## A design pre/post-processor for the *GENESIS* structural optimization software

Introduction

- **Task oriented:** Just follow built-in trails (wizards) for all common and not-so-common design tasks

- Multiple tasks can be **performed simultaneously** without abandoning the current trail (e.g. add a design variable while creating perturbation vectors).

- Designed to **easily select** all quantities needed in optimization such as grids, elements, properties, etc.

Introduction

- **Easy to Learn:**
  - Built-in trails guide most design tasks
  - Design-oriented, not Genesis data-oriented
  - Consistent
    - Once you learn how to create few data, you know most of it.

- **Easy to Use & Powerful:**
  - Few clicks will allow to create most design data
  - Shortcuts for common optimization tasks
  - Can work with multiple data at once
    - E.g., change all bounds of all design variable with just few clicks

Creating Data

- ## Data Trail Guides Process

- ## Quick Trails for Common Tasks

- ## Filtered Lists Present Acceptable Selections Only
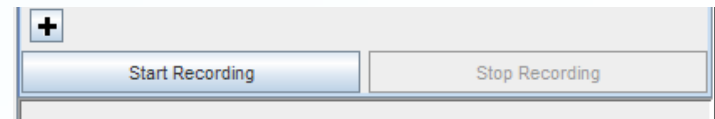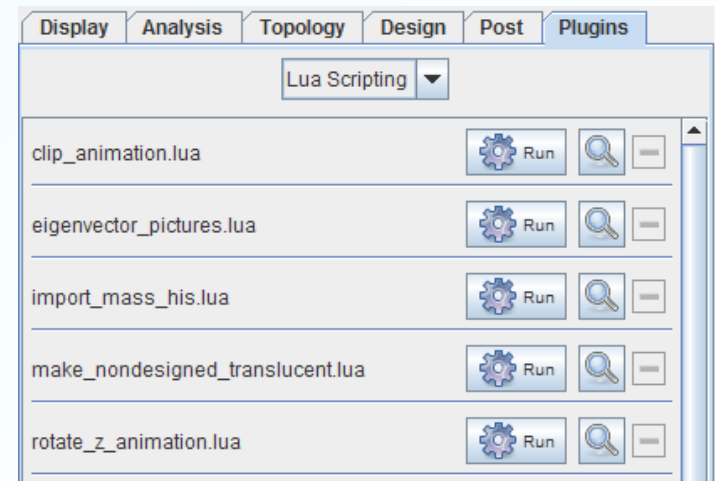
- **Inspect Current Item Settings**
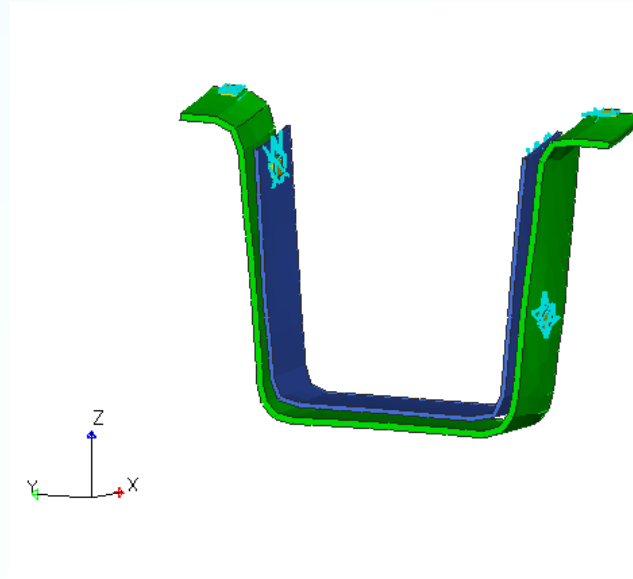- **Change Multiple Items in One Shot**

• **Lua Scripting Plugin**

– Start/stop recording

Editing

- **Views Shells as Solid**
- **Two Clipping Planes for Cross-Section Views**
- **Exploded View**

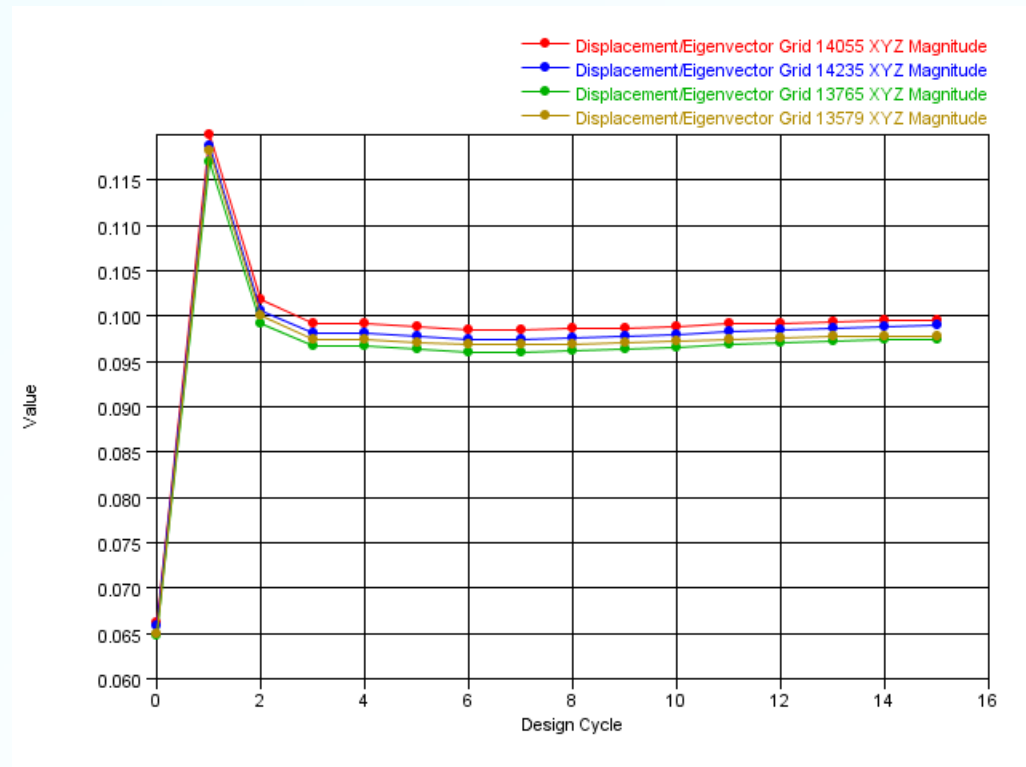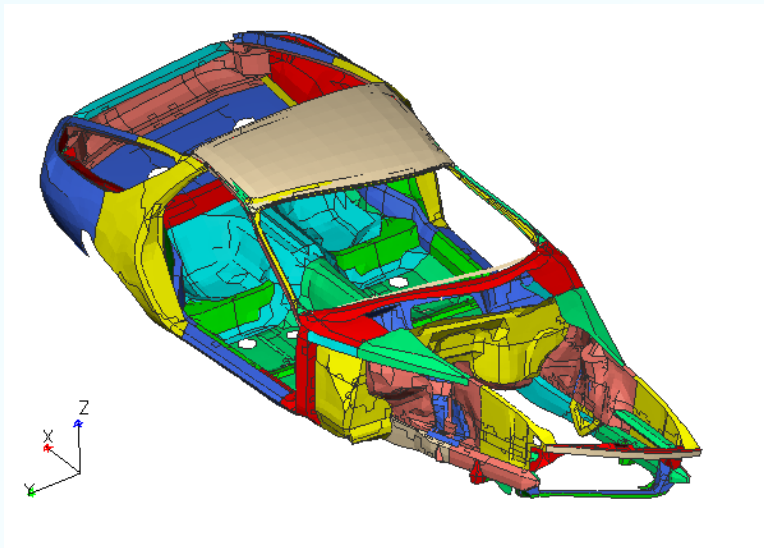# Post-processing Results

- **Deform Plots and ColorMesh Plots**

- **Isosurface Plots**
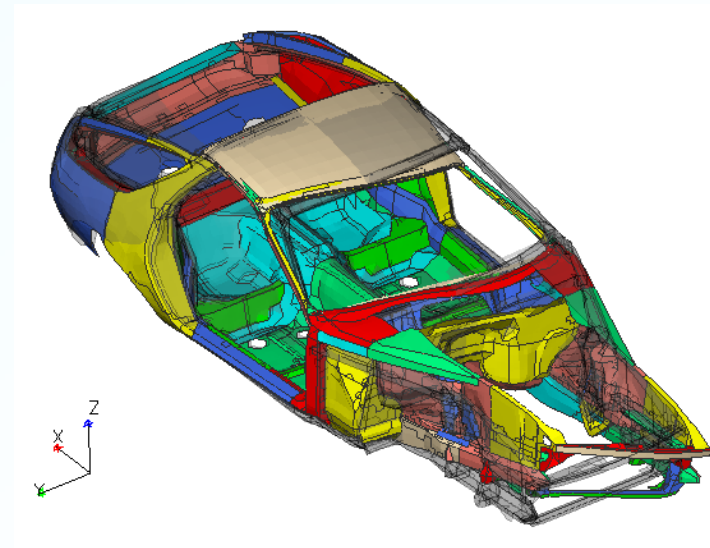
- **Frequency Response Plots**

- **Path XY Plots**

• **Design History Plots**

Post-processing

- **Undeformed Ghost View**
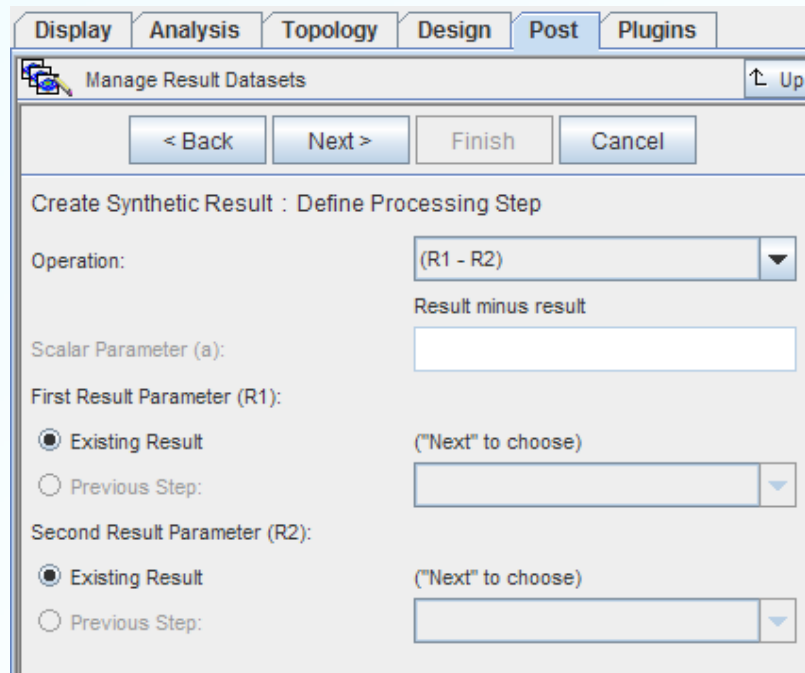

Without Undeformed

With Undeformed

Post-processing

- ## Synthetic Results

Post-processing

- **Tags to Annotate Grids/Elements**
- **Tags to Show Color Result Min/Max**

PSOLID 2404
Not Designable

PSOLID 904
Designable Region
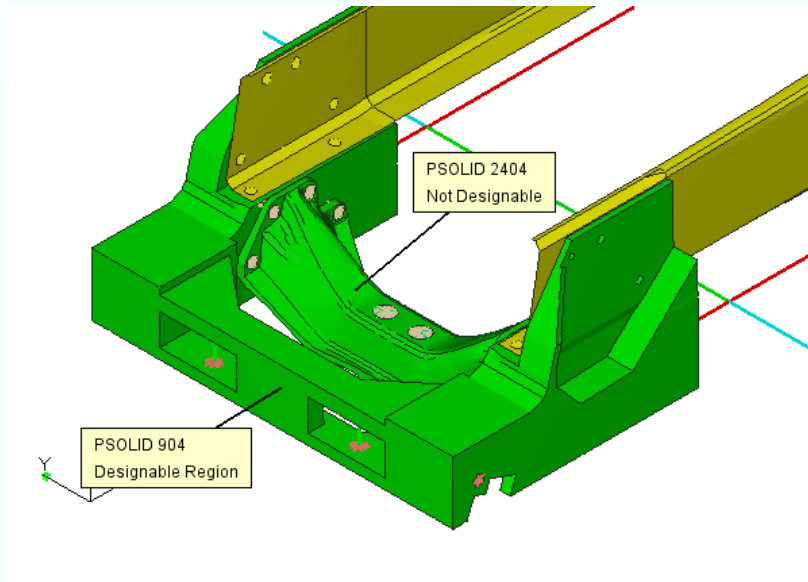
- **"Clean Stop" Button in Genesis Console**

  – Stops at end of current design cycle

  – Deletes scratch files

  – Prints results for

    APRINT / DPRINT / UPRINT = LAST / FLAST

New Features in Version 14.0

- ## New Selection Options
  - Grids from selected elements
  - Elements from selected grids
  - Used grids in load / SPC sets

- ## New Load Definition Options
  - Vector components
  - Cylindrical / spherical coordinate system

- ## Delete Free Grids when Deleting Elements

New Features in Version 14.0

- **Sort Item Lists by Description or Name**

- **Right-Click Menu on Lists**
  - Edit / Copy / Delete
  - Show / Hide on group lists

New Features in Version 14.0

- **ColorMesh Distribution Printout**

- **Alternate Ramp Animation Style**

- **Shape Morphing Preview Sets Scale from DVAR**

- **Frequency in Eigenvector Result Description**

New Features in Version 14.0

- **All new data in *GENESIS* 14.0 supported**
  - CPYRA element
  - Topology maximum member size
  - New topology fabrication constraints
  - Topology design for anisotropic materials
  - Stick/slip option on CGLUE
  - More...

Concluding Remarks

- **Design Studio is Powerful, Yet Easy to Use**

- **Design Studio is Being Continuously Improved for Functionality**

- **Numerous User-Requested Features are Being Added**

Questions?

Thanks for Attending