

LEONI

Surrogate models with pSeven Snaphook cases



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LEONI

Agenda

1

› Introduction

2

› Work with pSeven

3

› Results and conclusion

4

› Discussion

Wiring systems

New challenges, new skills



ASIL functional safety
redundancy
Reliability forecast

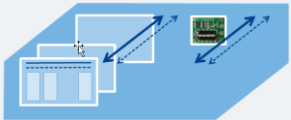


Solutions HV, 48V

Composants de distribution

Pack batteries

connections module, cellules



Connected mobility

Autonomous mobility

Revolutionizing productivity

Electrified mobility

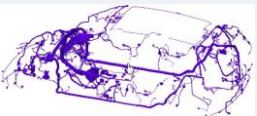
Solutions and services



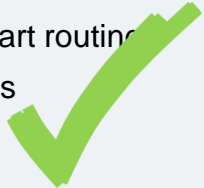
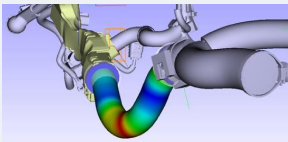
Network Standards
Câbles, fiber ...



Automatization
Quality vs process
New product

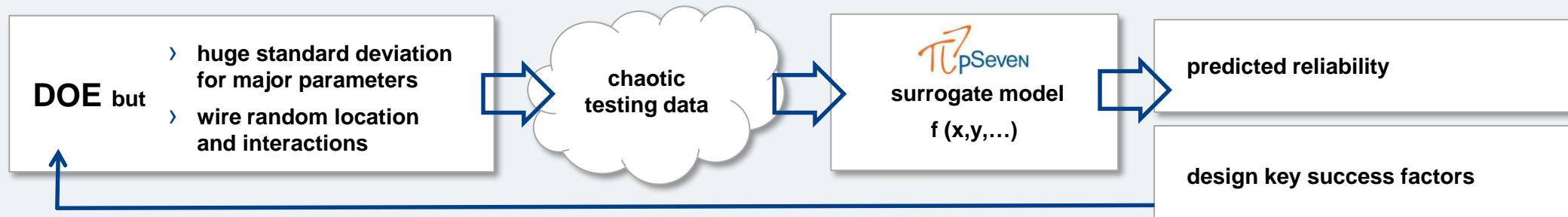


Lightening
Function Intégration, sensors
3D Simulation Smart routing
behaviour analysis



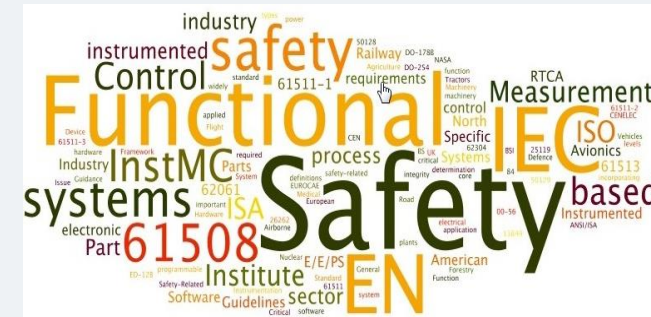
Lab experiment, predictive reliability

Lab experiment, predictive reliability



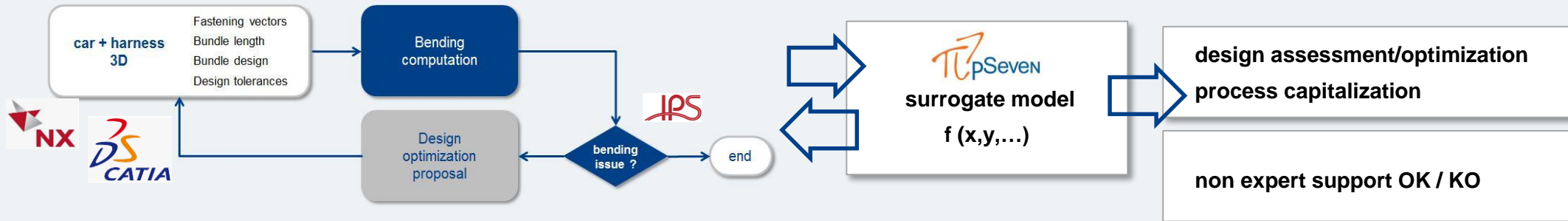
Automotive trend :

- › Answer functional safety issues, predictive reliability assesment
- › ASIL Automotive Safety Integrity Level
- › Harness bending in many car location



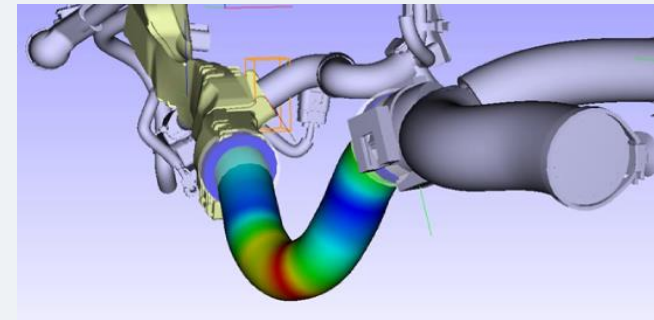
Harness bending

Design assessment and optimization



Automotive trend :

- › Using software such as IPS, flexible components, bending behavior
- › Automation of the design steps, design rules capitalization
- › Tools chains, data exchange between design and simulation softwares



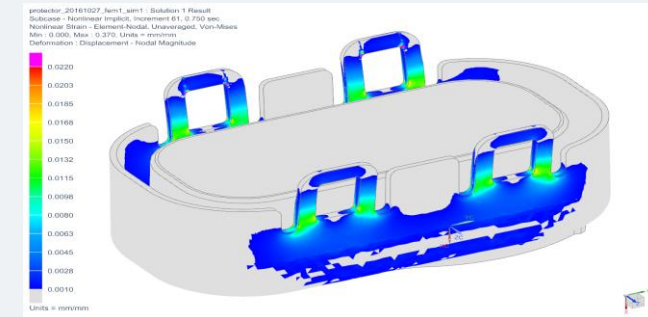
Components design

Surrogate models versus standard FEM



Automotive trend :

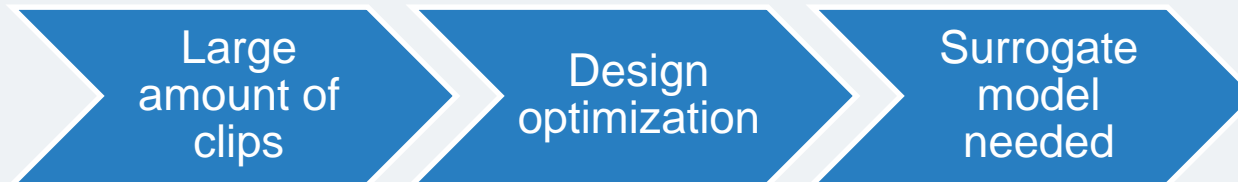
- › Make the designer autonomous
- › Design rules capitalization, self assessment of the design
- › Standard resources versus experts, human and tools



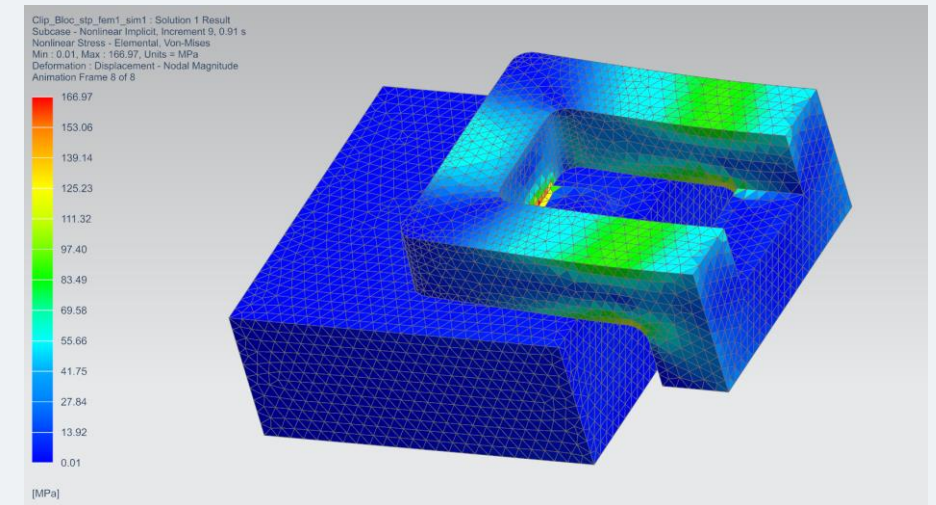
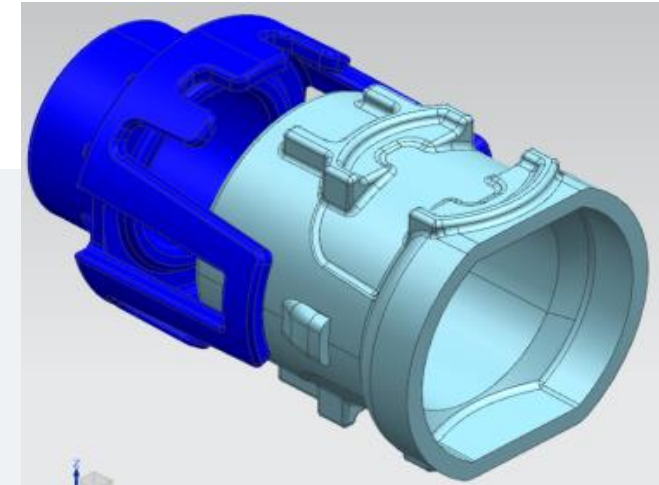
Introduction

Presentation of the example

- › In the development we are working on clips for parts
- › Simulations are done to identify/solve problems



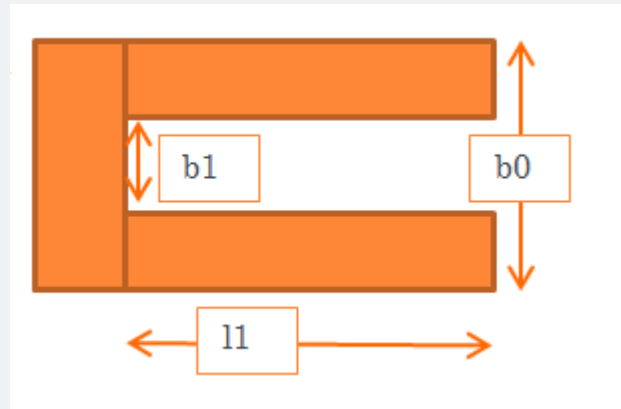
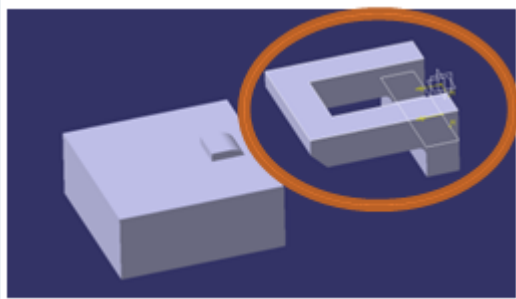
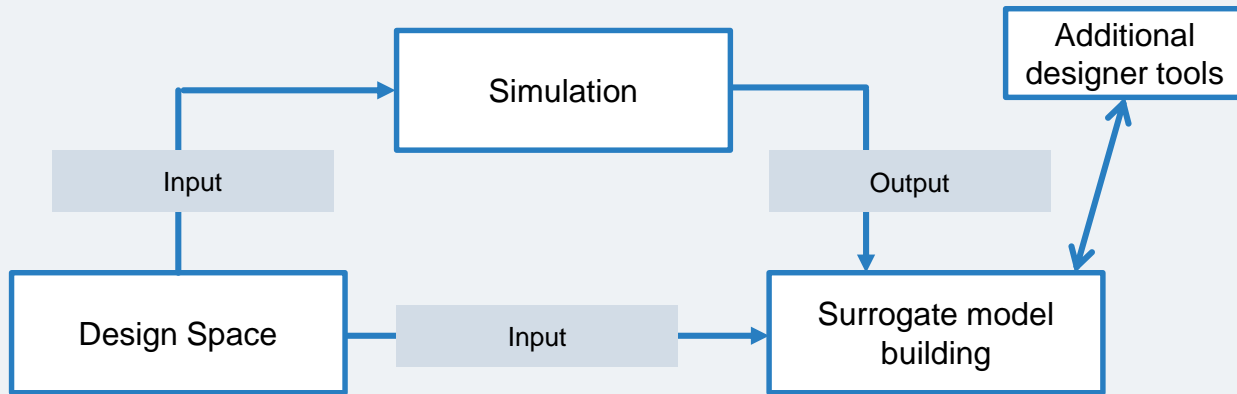
- › Catia input data and calculation with Nx Nastran



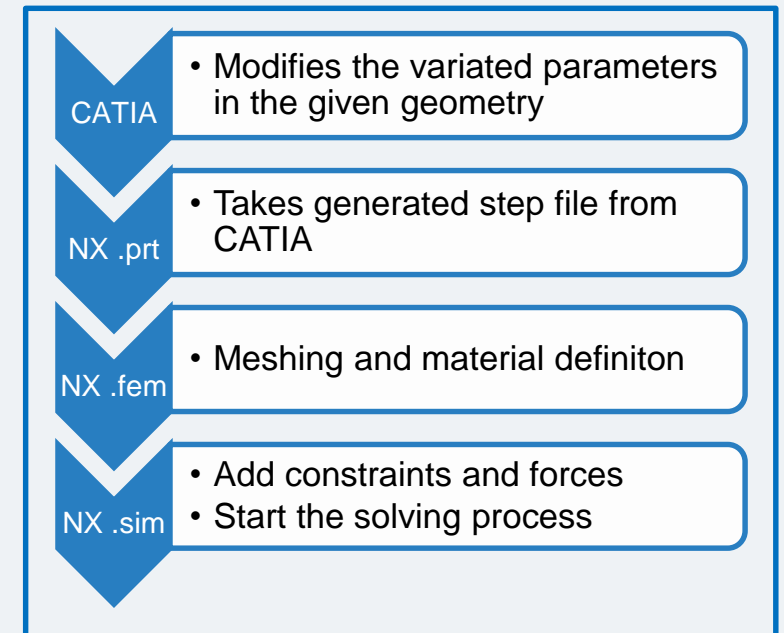
Work with pSeven

Parameters and plan

Workflow used:



Steps

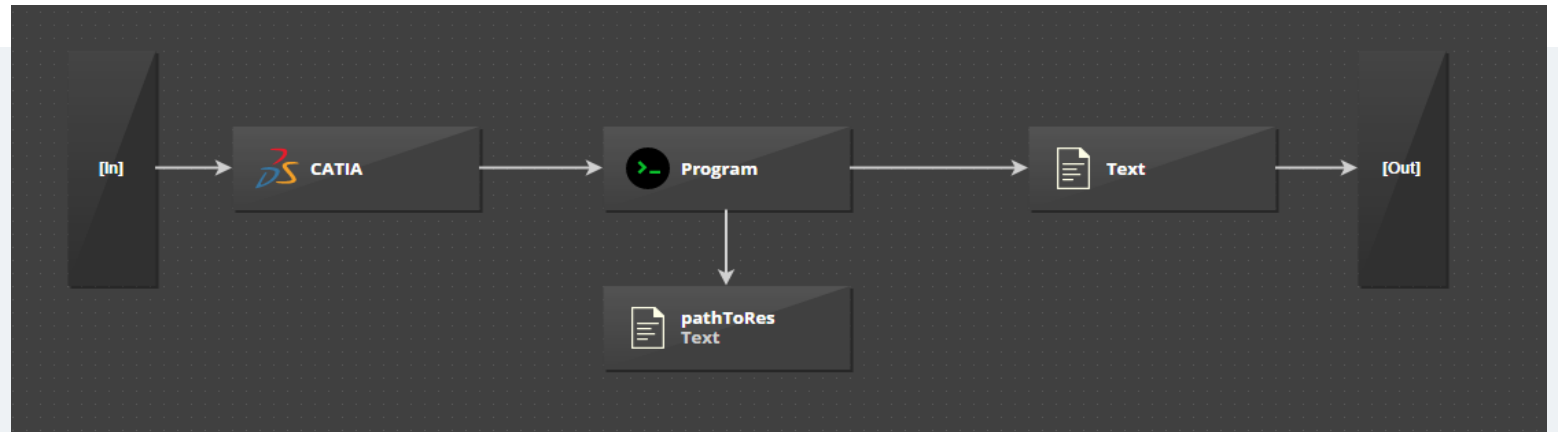


Work with pSeven

Nx Nastran Simulation to pSeven

- › Implementation in pSeven

- › Catia .step file given as input



- › This file is going in « Program » which represents the simulation running with a Nx Nastran Journal (To automatize the simulation and output given)

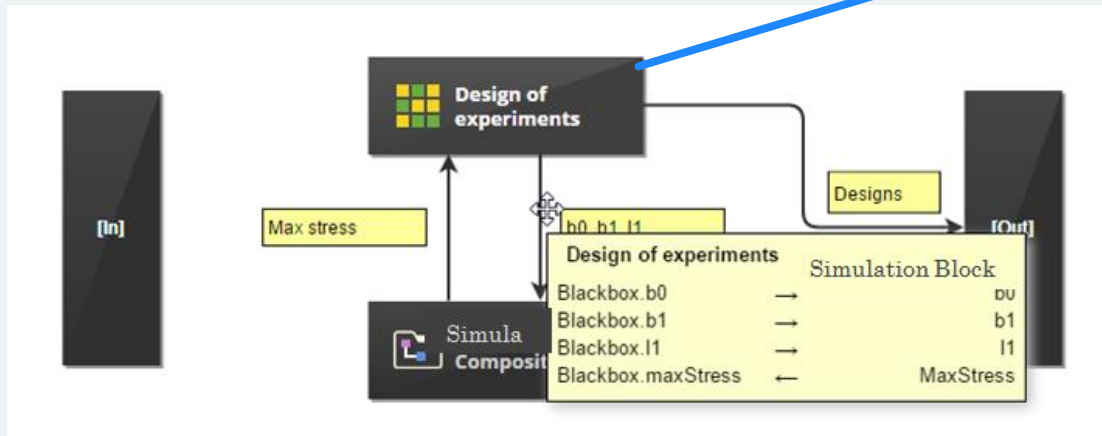
- › The block « PathToRes » is receiving all the results from the simulation

- › Then a .csv file with the maximum Stress data is going out from the block « Program » to be read in the « Text » file

Work with pSeven

Surrogate model creation

- › The task is now to create the design of experiment to have the surrogate model
- › Choice of the design numbers, sample technique, variable and so

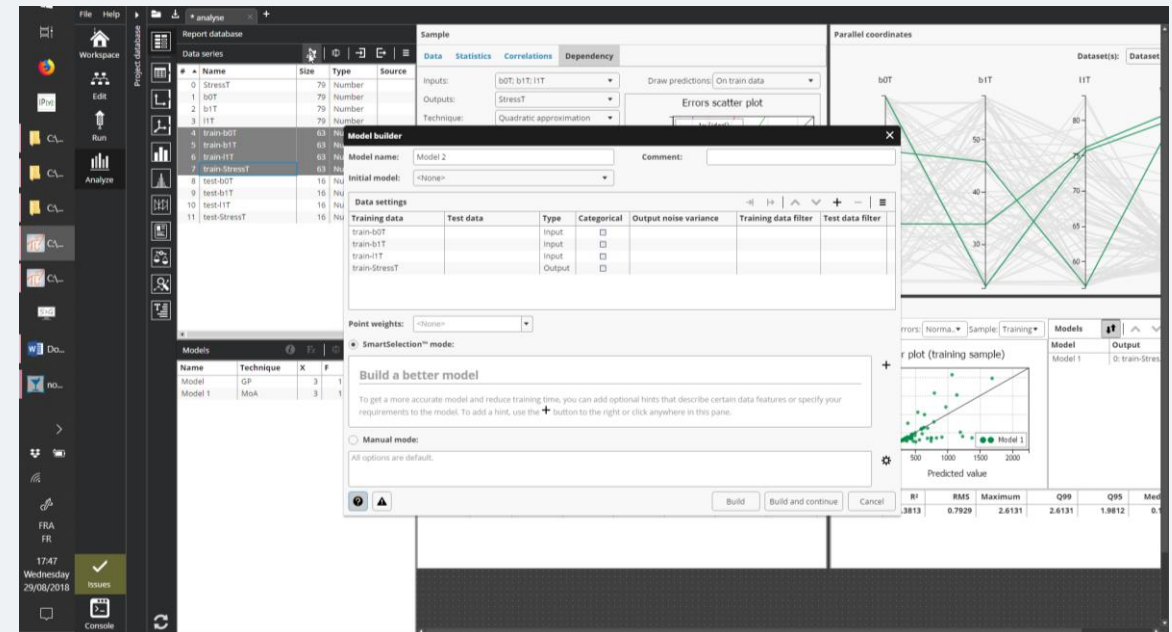
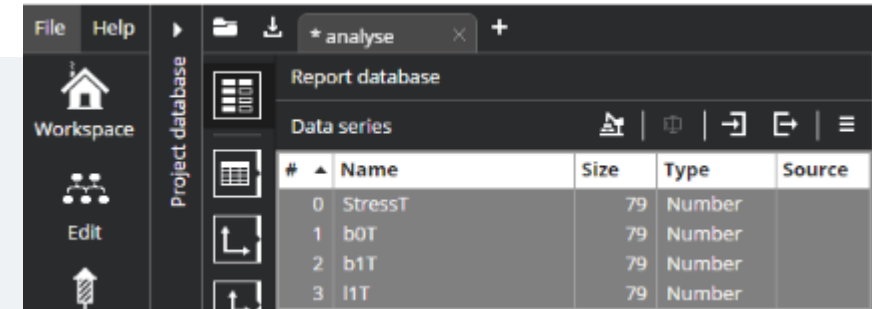
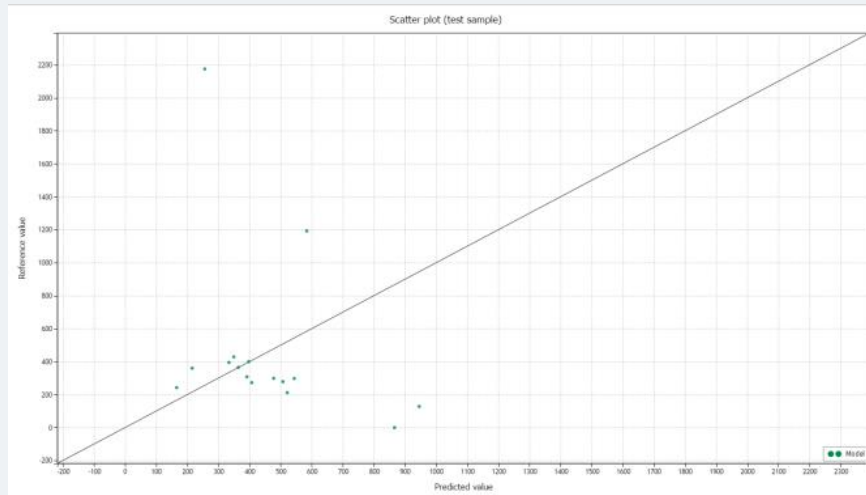


The screenshot shows the 'Design of experiments (Design of experiments)' configuration dialog. The dialog is divided into several sections: 'Add responses', 'Add variables', 'Configuration', 'Options', 'Technique options', and 'Run options'. The 'Configuration' section is currently active, showing the 'Number of designs' set to 100 and the 'Technique' set to 'Latin hypercube sampling'. The 'Options' section shows a table of variables: b0, b1, and I1, each with a size of 1 and a value of 1.0. The 'Technique options' section shows a table of technique options: Iterations (300) and Property preservation (False). The 'Run options' section shows a table of run options: Batch mode (False), CPU cores limit (0), Deterministic (True), Error handling behavior (stop workflow), Include initial sample (True), Maximum batch size (1000), Random seed (100), and Verbose output (False). The dialog is annotated with orange boxes and numbers: 1 points to the 'Number of designs' field, 2 points to the 'Technique' dropdown, 3 points to the 'Variables' table, and 4 points to the 'Responses' table.

Work with pSeven

Surrogate model creation

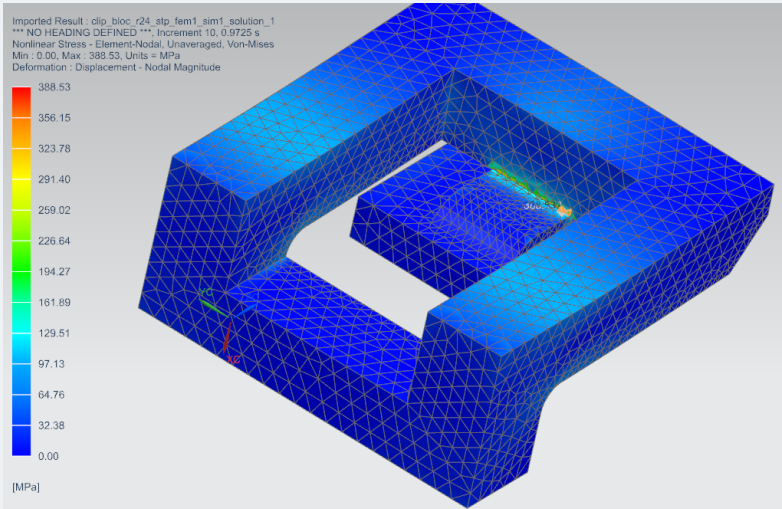
- › Now it is possible to finally obtain the surrogate model
- › 79/100 designs left cause of design space choice
- › Several analysis, dependances of parameters and so but not relevant
- › The model can then be build



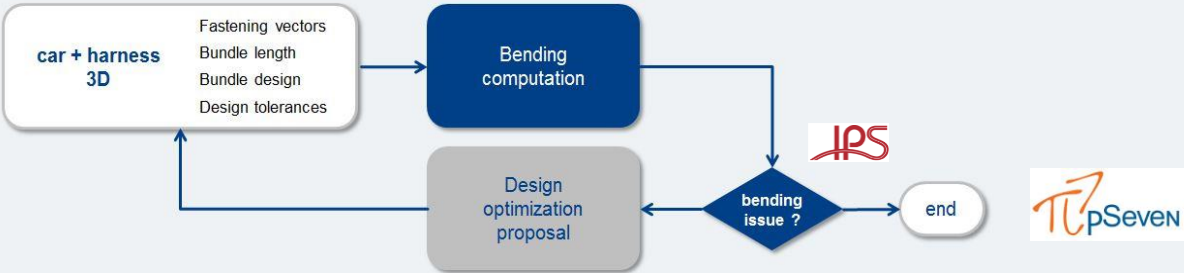
Results and conclusion

Next steps

› Use case Snaphooks



› Further projects durability incoming



Surrogate models with pSeven Snaphooks case

Conclusion



Question & Answer

Thank you for your attention