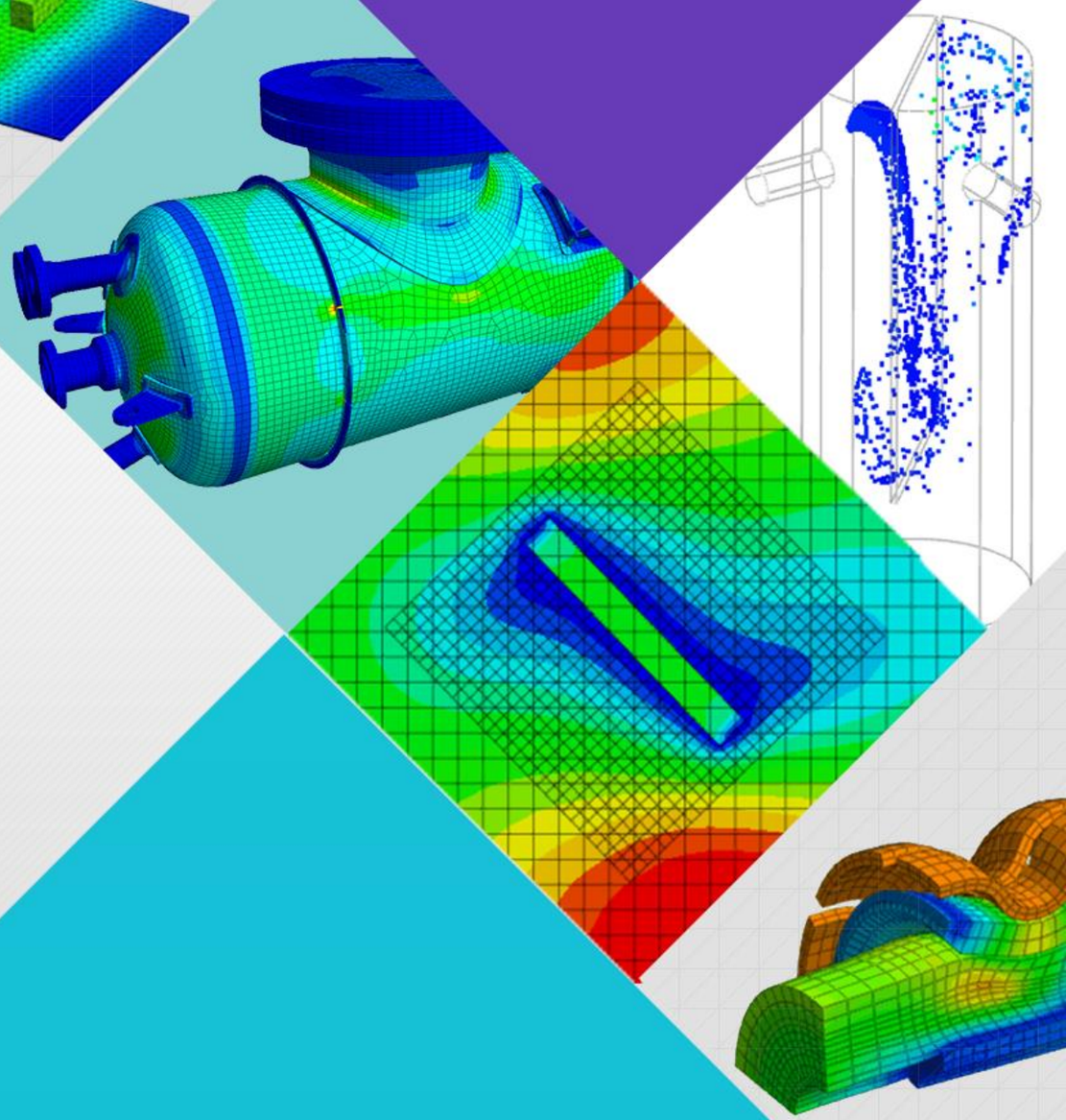
midas NFX 2015 R1

Release Note



Accurate whenever you Need

Be more efficient by focusing on the right details and get Accurate results

midas NFX 2015 Release

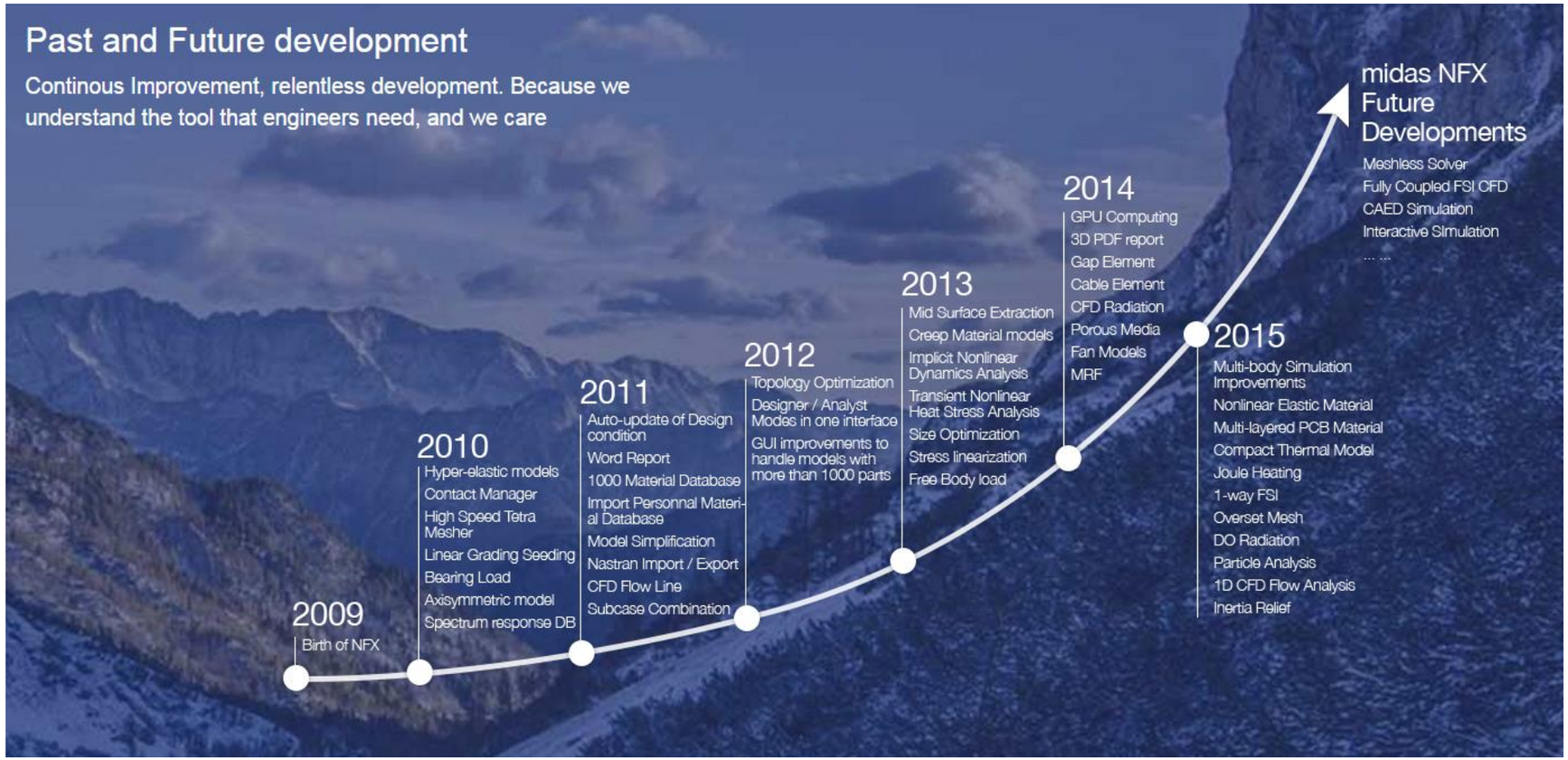
midas NFX 2015

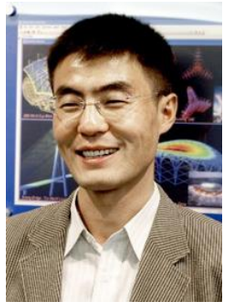
Midas NFX has been improved once again !

Life of an engineer is not static and FEA software should improve continuously to meet the needs of newer and better tools to solve models which are becoming more and more complex.

Every year, we work hard to provide the best analysis and features that our clients require and you can see on the left the improvement that we did since midas NFX's first release in 2009.

Thank you for staying faithful to our value and believing in us !





Daeseok Shin
MIDAS IT Technical
Research & Development
Director

1-way FSI (Fluid-Structure Interaction)

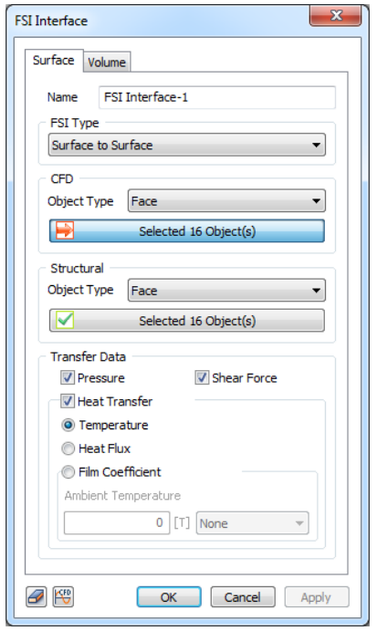
midas NFX 2015

This New Fluid-Structure Interface allows the exchange of Data between Fluid Analysis and Structural Analysis.

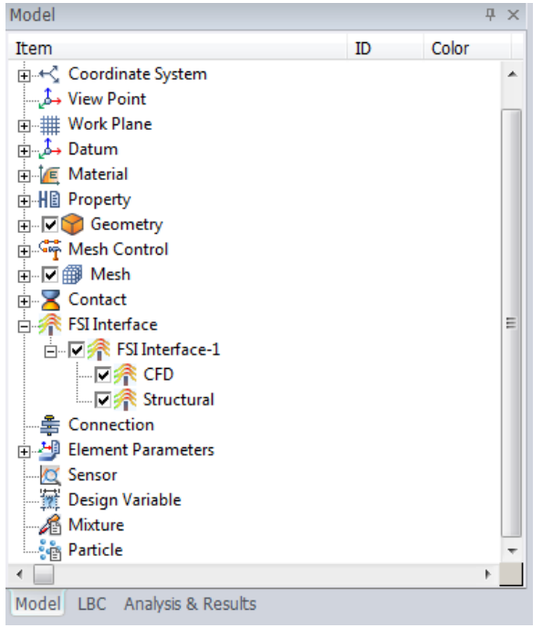
Analysis Results for Fluid Analysis are directly transferred to the structural analysis model through FSI contact interface.

FSI interface is defined in the same way as a manual contact between 2 parts.

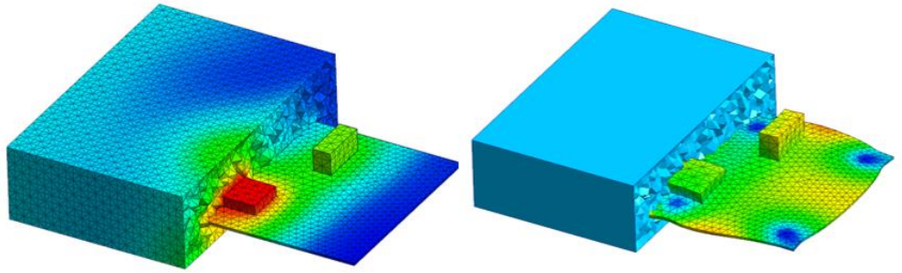
Data such as Pressure, Shear Force, Temperature, Heat Flux and Film coefficient can be transferred automatically from fluid to structural model.



FSI Interface definition window

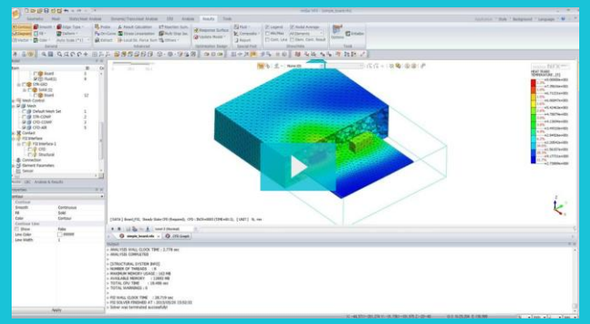


FSI Interface inside the work tree menu



Media Resources

The developer explains 1-way FSI
(Click to watch the video)

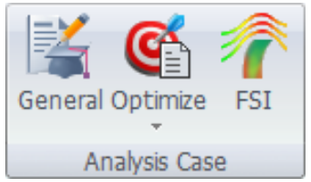


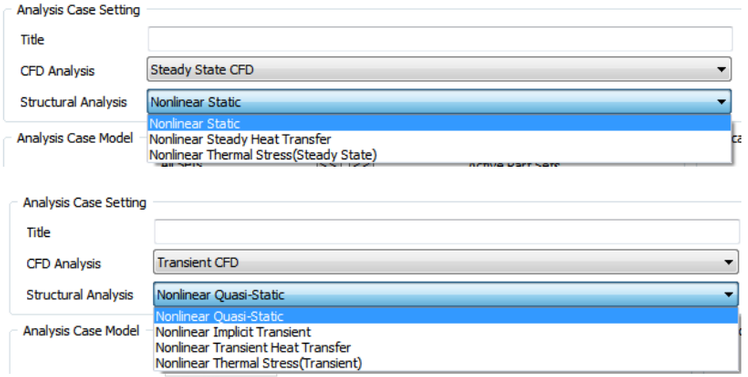
1-way FSI step-by Step Tutorial
(Click to watch the video)

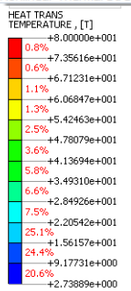
1-way FSI (Fluid-Structure Interaction)

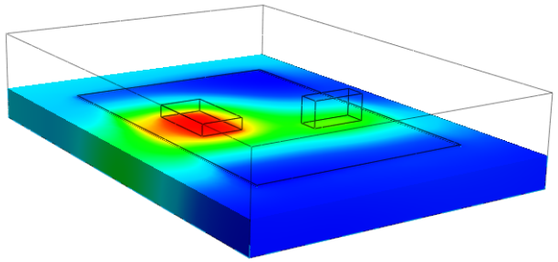
FSI Analysis Case is defined to link a Steady Sate CFD Analysis to a Nonlinear Static Analysis, a Nonlinear Steady Heat Transfer Analysis or to a Nonlinear Thermal Stress Analysis.

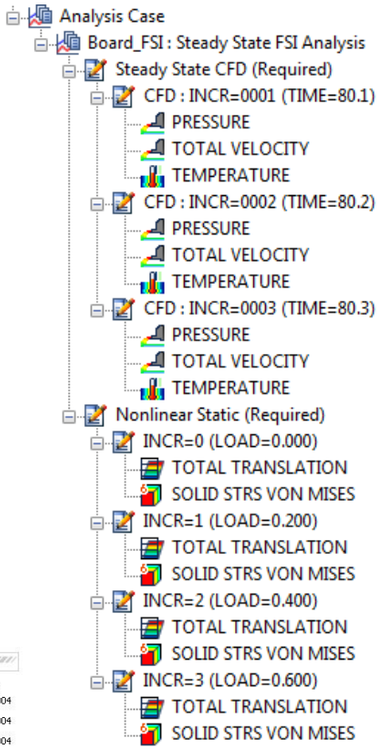
FSI Analysis Case can also be defined to link a Transient State CFD Analysis to a Nonlinear Quasi-Static, a Nonlinear Implicit Transient, a Nonlinear Transient heat Transfer or a Nonlinear Thermal Stress (Transient) Analysis.

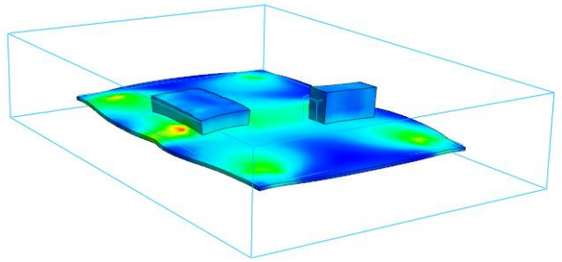


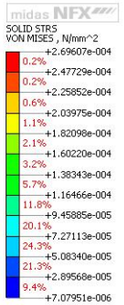








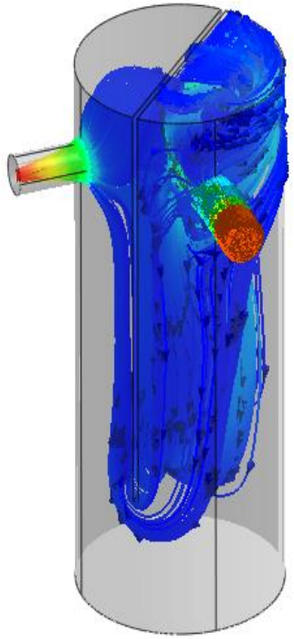




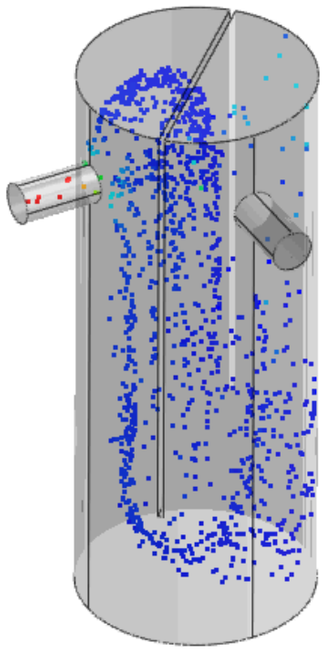
Particle Tracking – DPM (Discrete Phase Model)

This feature creates particles that can create drag in the fluid, collide with the walls and are submitted to gravity.
Particles are not interacting between each other.

The 1-way method creates particles that cannot interact with the fluid. The 2-way method creates particles that interact with the fluid.



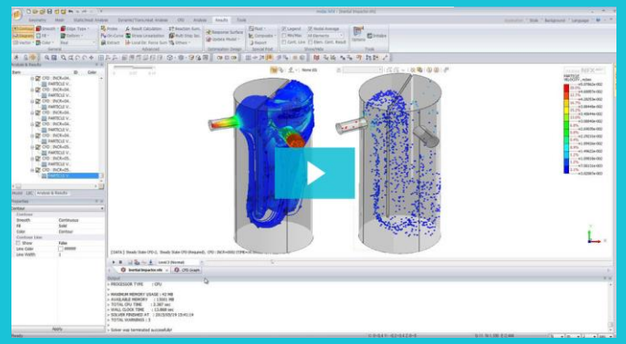
Results of Particle Analysis
(Particle Trajectories)



Particle Analysis Results
(Particle Position)

Media Resources

The developer explains particle Analysis
(Click to watch the video)



Particle Analysis Step-by-step Tutorial
(Click to watch the video)

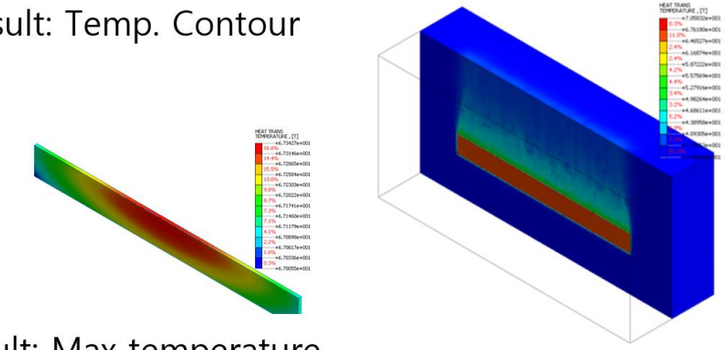
Joule Heating Structural/CFD Analysis

midas NFX 2015

Used to analyze the heat generated by the flow of current inside a conductor.

Joule Heating can be used in all kind of electric equipment to analyze the influence of heat generated by electric wires

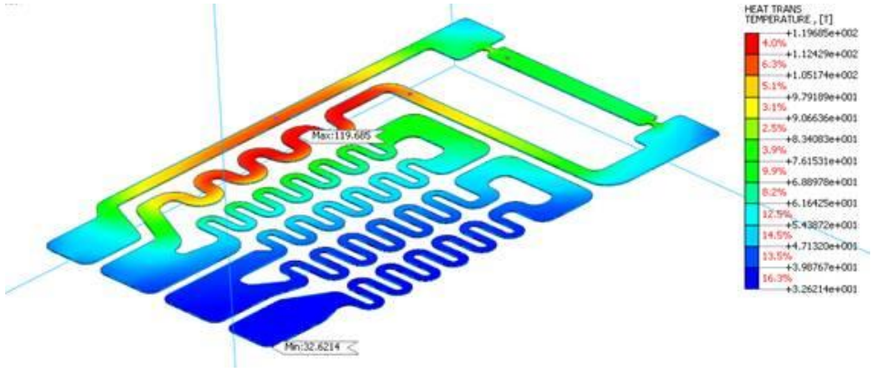
Result: Temp. Contour



Result: Max temperature

Theoretical value	midas NFX	'F' Software
65 ℃	67.3 ℃	70 ℃

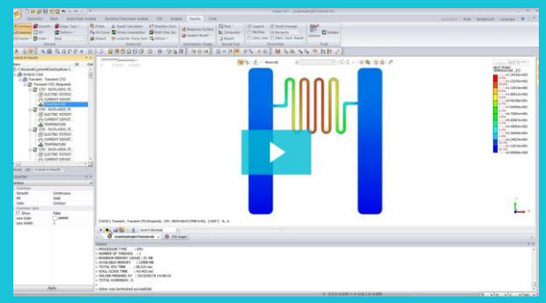
Obtained results are very close to the theory



Joule heat Generation Analysis Setting Window

Media Resources

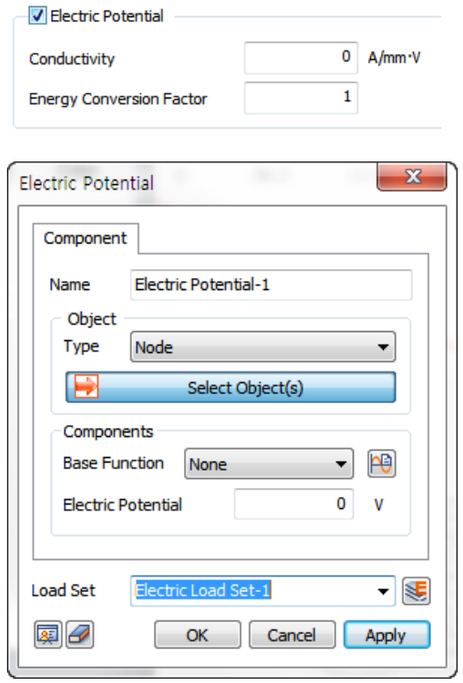
The developer explains Joule Heating
(Click to watch the video)



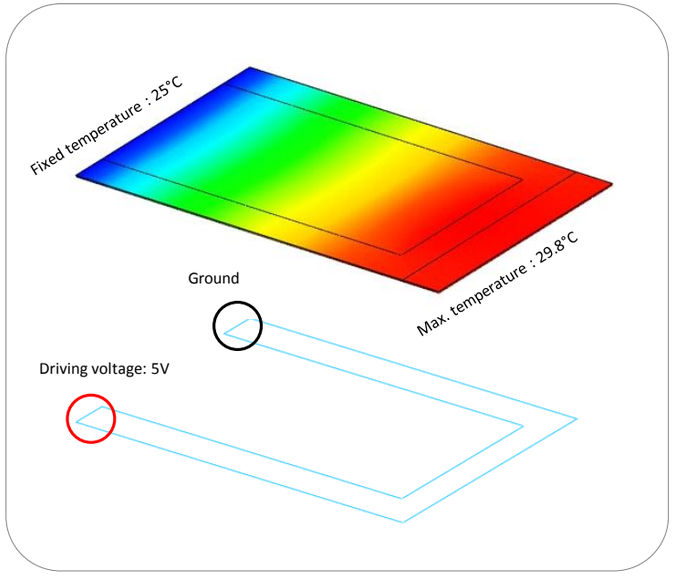
Step-by-Step Video tutorial about Joule Heating
(Click to watch the video)

Joule Heating Structural/CFD Analysis

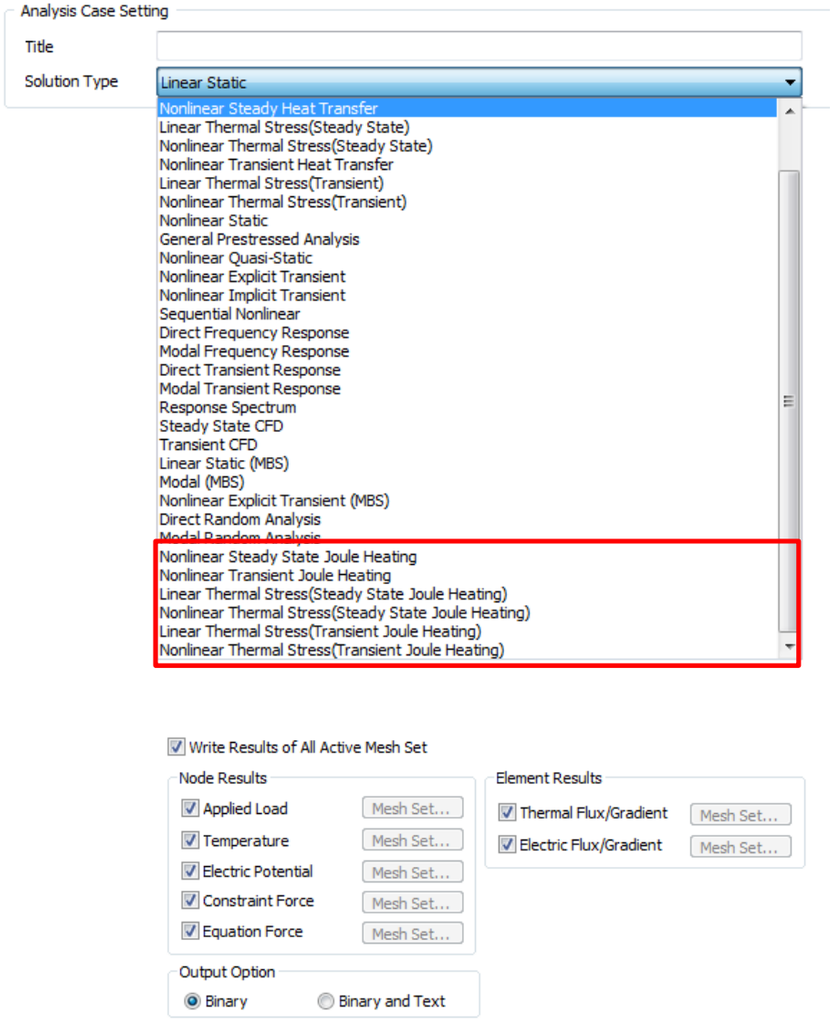
6 new analysis types related to Joule heating have been added along with Electric potential in material data, Electric Load and Potential loads.



Electric Potential

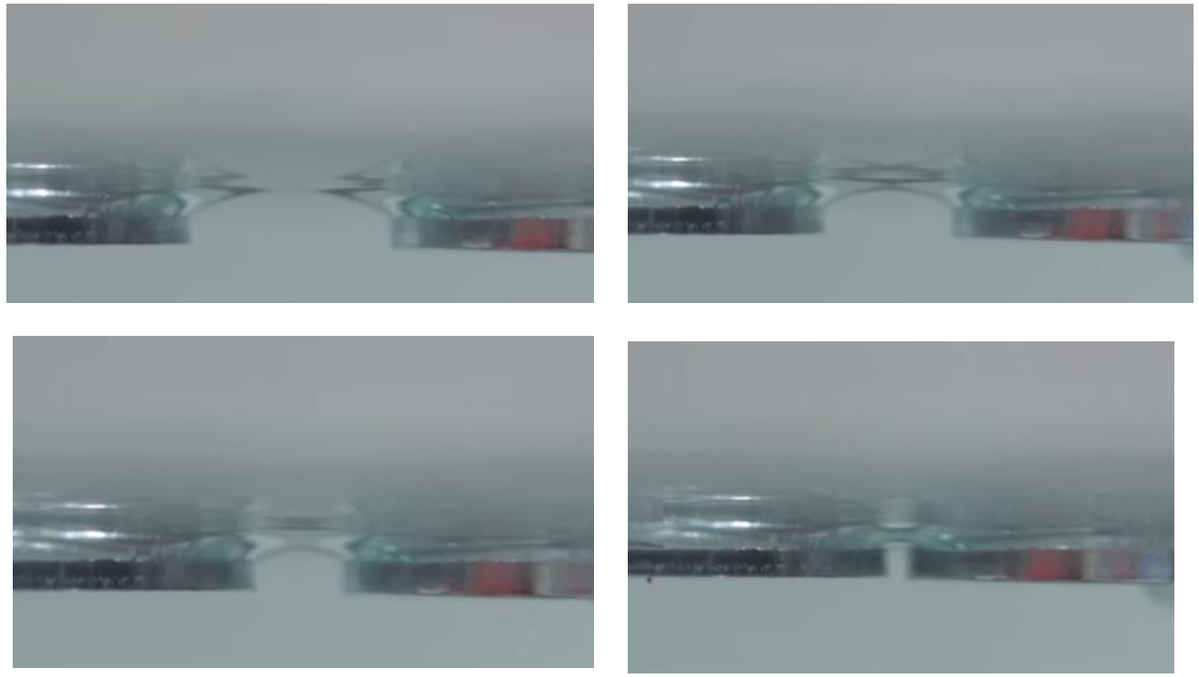


Joule heating in sample model with available result types

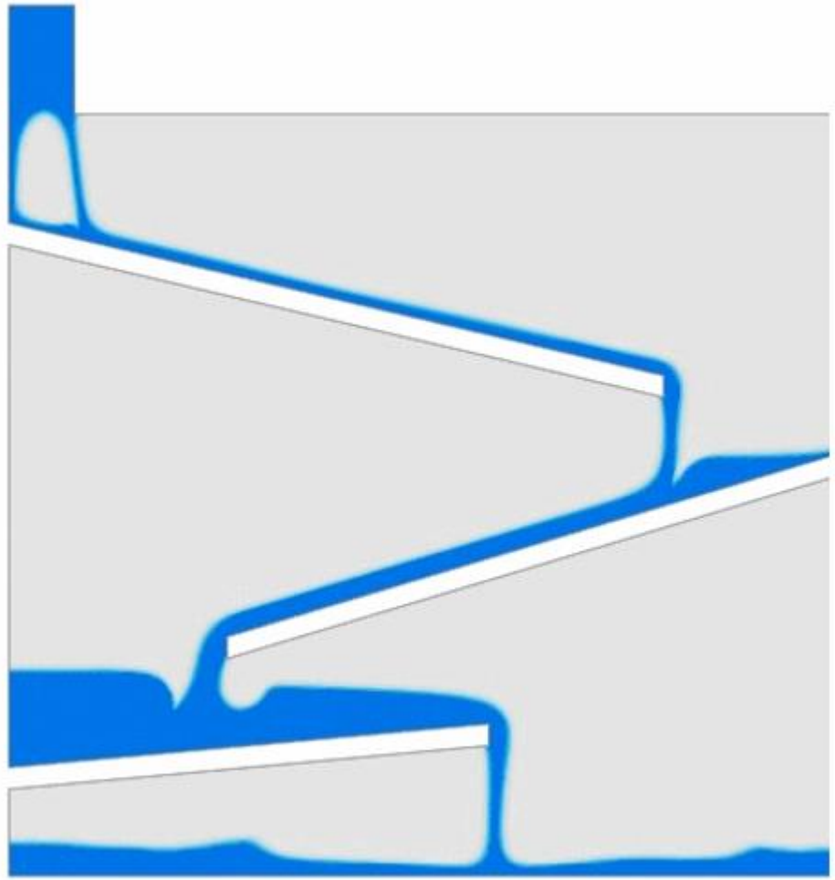


Surface Tension – CFD Fluid Material

Allows for multiphase modelling of free-surface flows with dominant surface tension effects



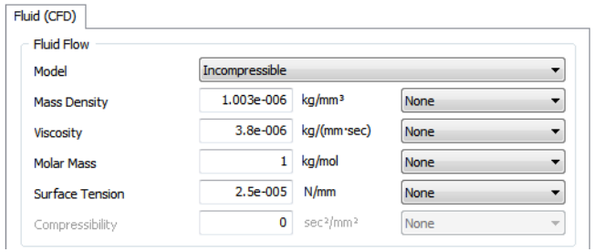
Surface tension – “self assemble” experiment



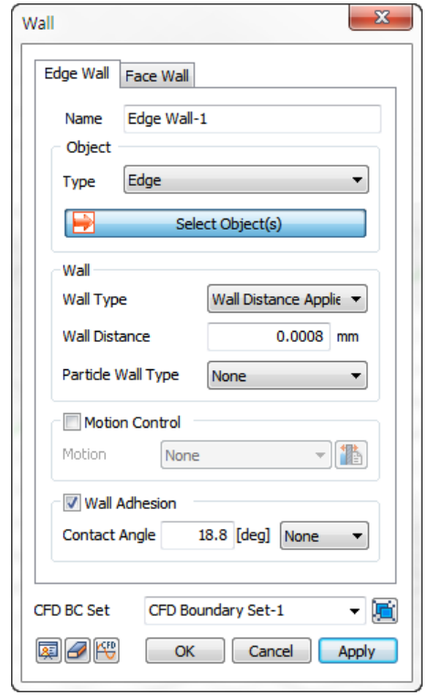
Improvement to free surface fluid flow due to surface tension

Surface Tension – CFD Fluid Material

Surface tension and contact angle during slot coating



Surface tension definition window

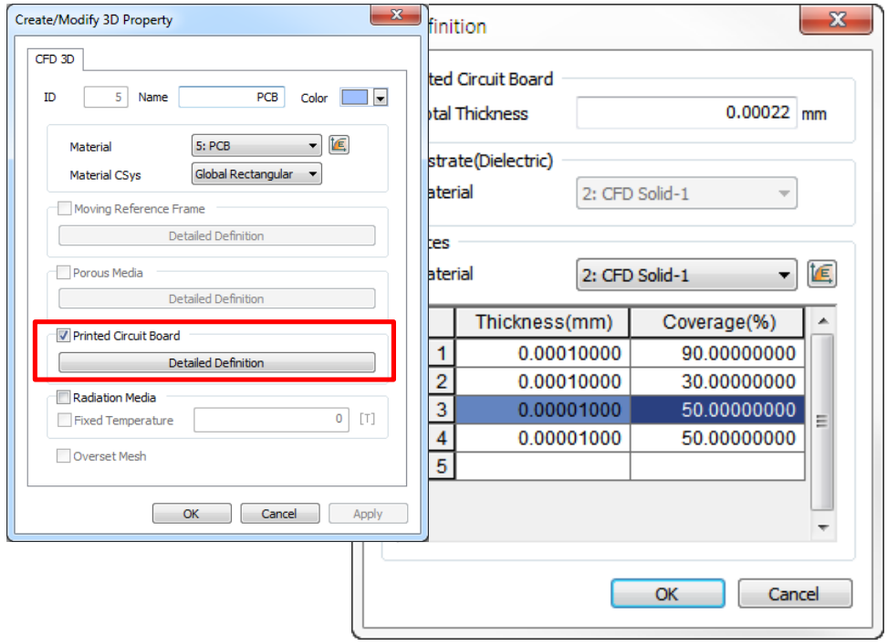


New Contact Angle option

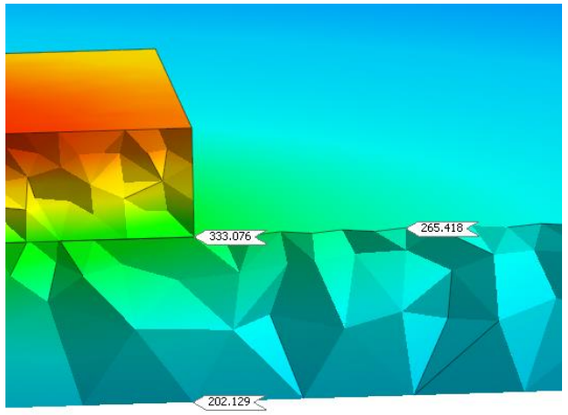
Detailed PCB property (multi layered boards)

midas NFX 2015

PCB model easily simulates the thermal conductivity of laminated PCB board.



PCB definition window



Temperature result considering copper volume in each PCB layer

Media Resources

Multi-layered PCB

Taking into account the effective thermal conductivity of a multi-layered PCB used to be a challenging task. See how NFX 2015 makes it easier for you

Try it in browser

Click to try the Interactive Tutorial

Overset Mesh

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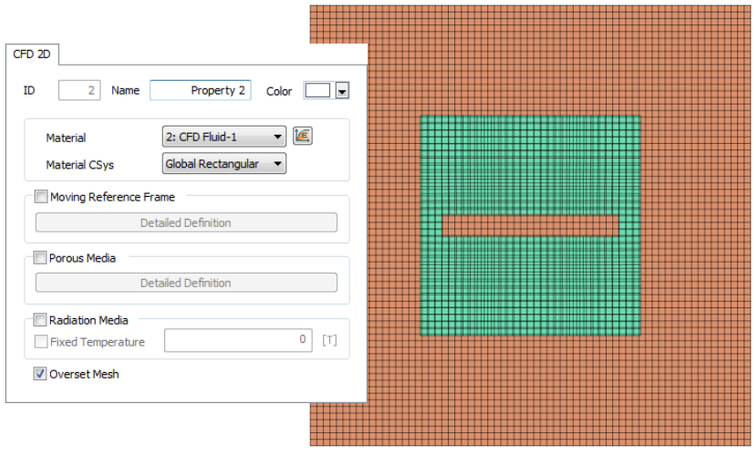
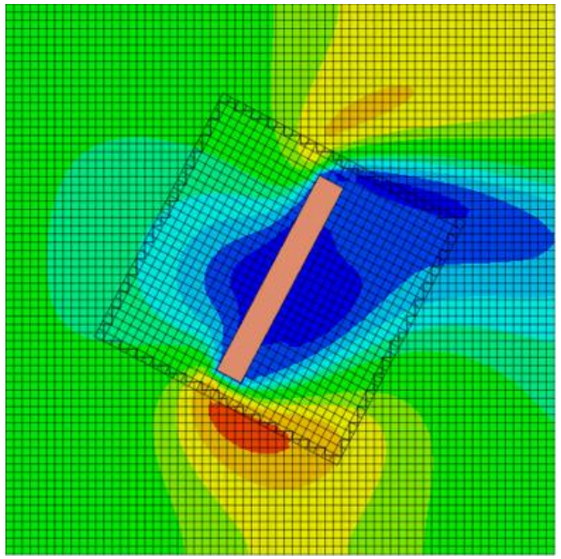
Overset mesh is a new method that allows to create a mesh set on the top of another one. The results will be calculated through the transfer of the data at the boundary of the overlapping mesh sets.

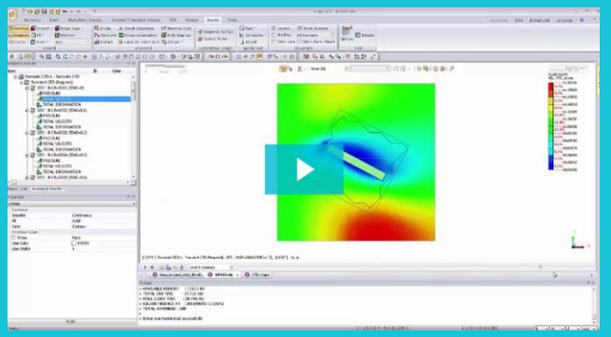
This methods allows to simulate larger displacements of a structural object in a Fluid



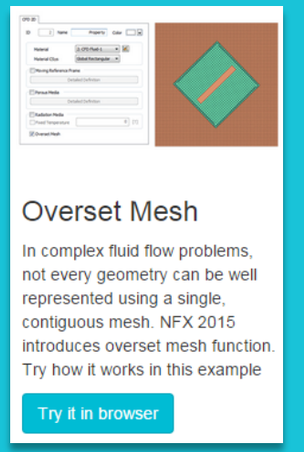
Overset option and related overlapped meshes



Velocity contour result



Step-by-Step Video tutorial about Overset Mesh
(Click to watch the video)



Click to try the Interactive Tutorial

COMPACT THERMAL MODEL

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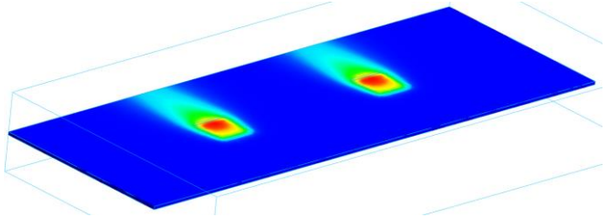
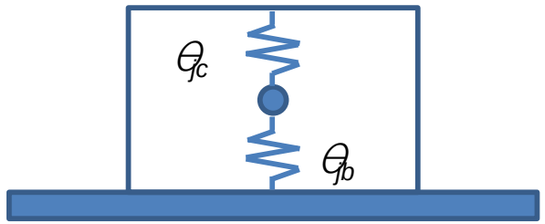
CTM is a simplified component model intended to reproduce the thermal behavior of a component in a wide variety of system-level simulations.

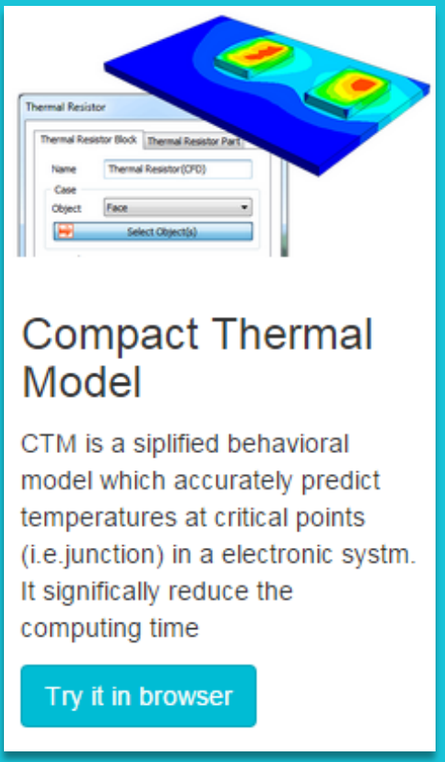
This new thermal resistance model allows the calculation of the temperature by inputting directly the Thermal resistance model values θjb, θjc which are reflecting the thermal conductivity in semi-conductor chip equipment. 2nd order thermal resistance model and network resistance model are both supported.



Thermal results using thermal resistance model



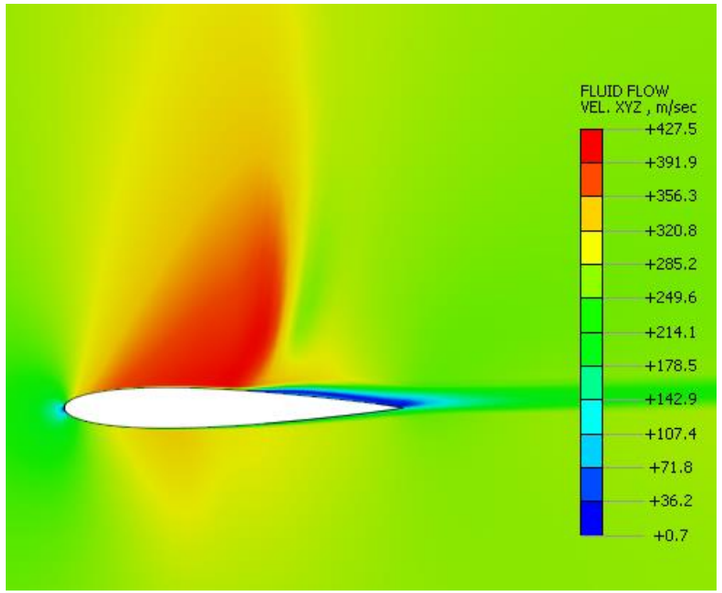
Thermal resistance model Scheme



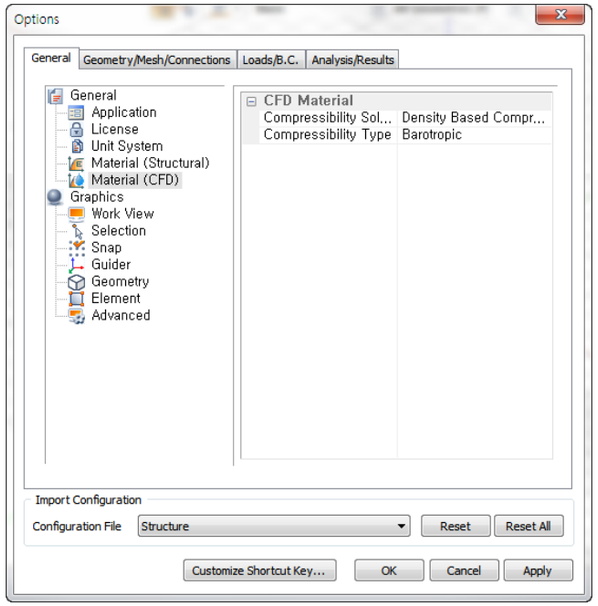
Click to try the Interactive Tutorial

Compressible Solver Improvement

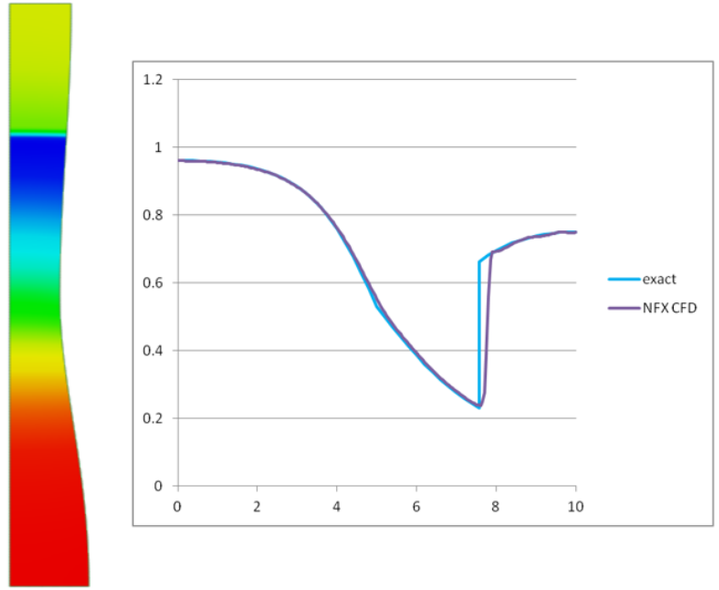
The compressible fluid solver has been improved to calculate shock waves in compressible fluid problems.



Peripheral speed of the airfoil transonic zone as interpreted by compressible flow solver



Density based compressible fluid solver setting window



Shock Wave Analysis in a CDV Nozzle (Compressible Solver)

1D CFD Boundary Conditions

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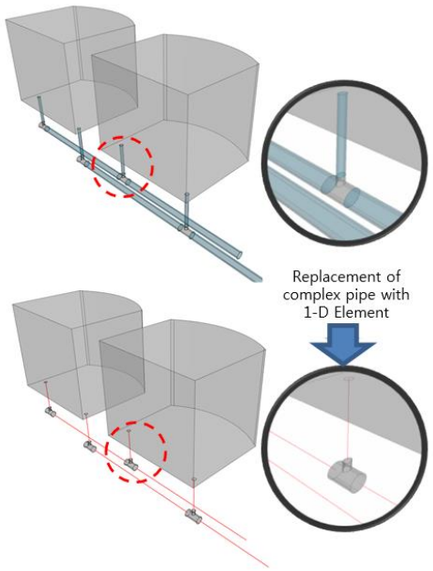
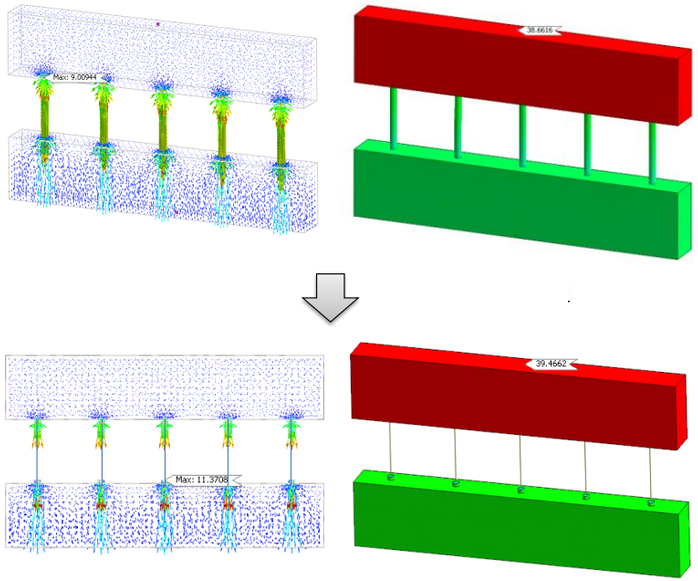
Media Resources

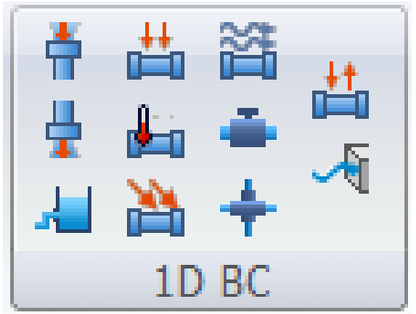
Using 1D CFD toolbox it is possible to analyze flow, heat, and mass transport in complex pipe networks very easily with great saving of computational time.



Pipe network example

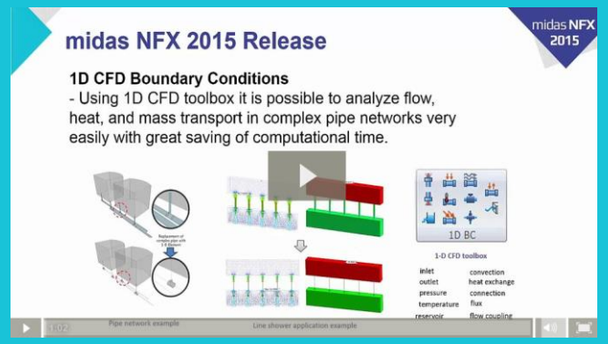


Line shower application example

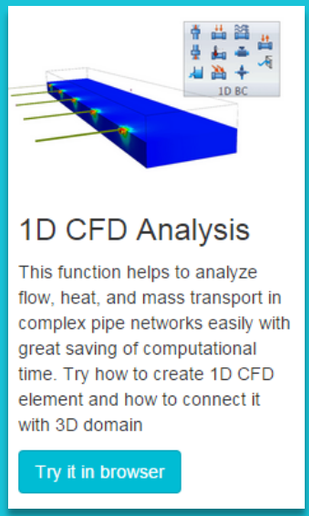


inlet
outlet
pressure
temperature
reservoir
convection
heat exchange
connection
flux
flow coupling

1-D CFD toolbox



Watch the explanation in video



Click to try the Interactive Analysis

Pre-processing: Peel Down feature

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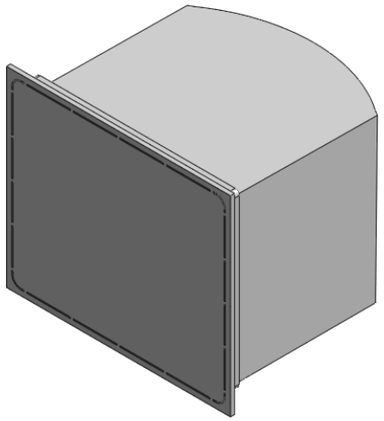
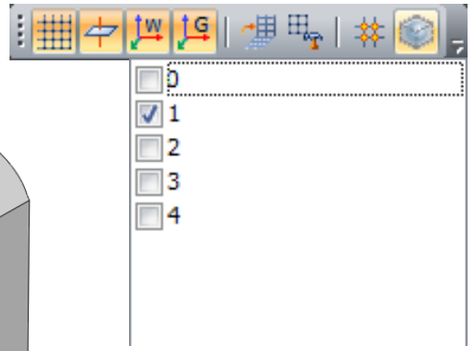
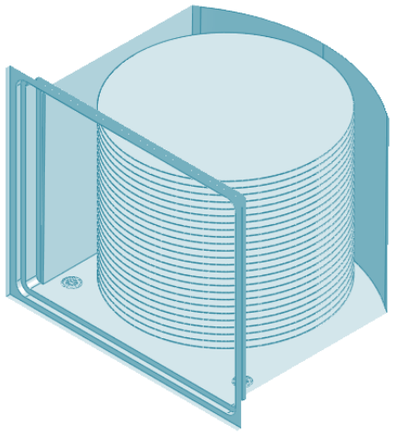
Peel Down tool for efficient selection of hidden geometrical entities

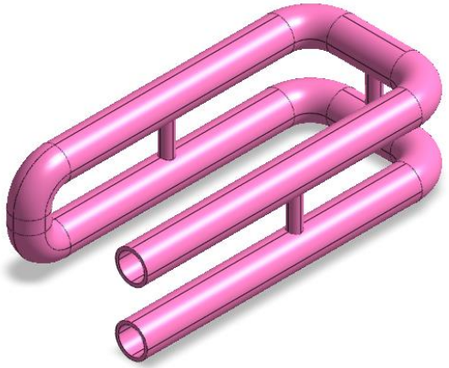


Default displayed view

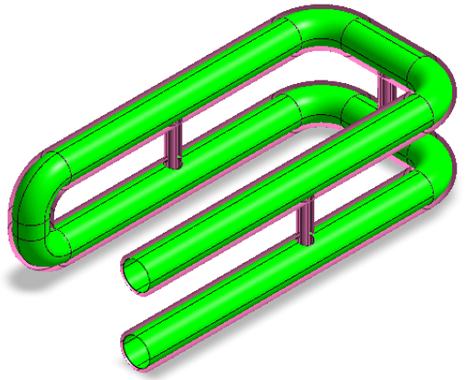




1st peeled layer view



Default geometry view



Peeled geometry - Selected inner faces

Click to try the interactive tutorial

MBS: Rigid Body Dynamic Improvements

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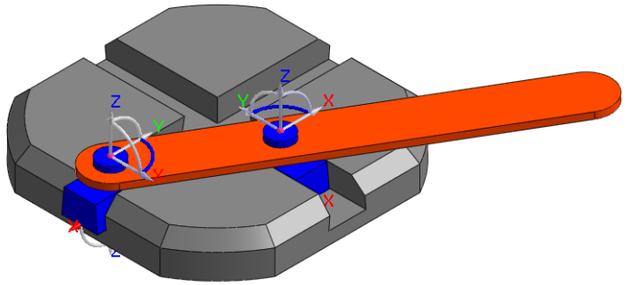
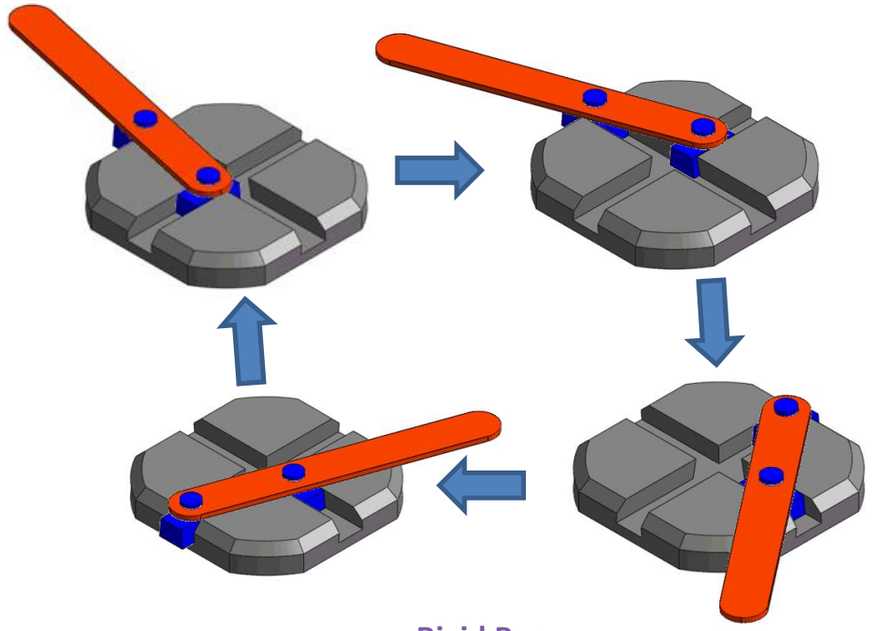
The first major change is that we were using the finite element method and in particular the penalty method to calculate the multi-body dynamics (MBD) equations. We switched to the recursive calculation method which is usually used in MBD which led to a significant improvement in accuracy and speed of calculation.
In a normal analysis, calculation speed have been improved up to 20 times.





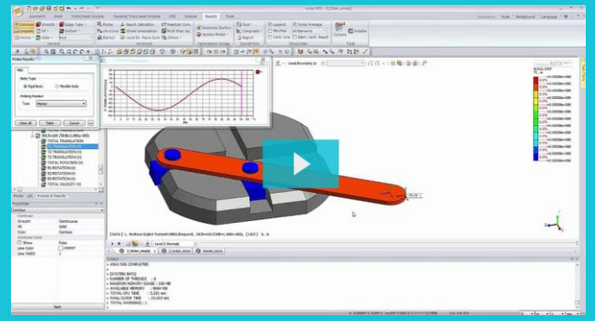
Rigid Body Motion

	Conv. EXP	New MBD
TIME	188.1	2.8

Analysis time comparison for rigid model
(12 parts, 10 constrains, 0.01s time interval, 300 steps)

Media Resources

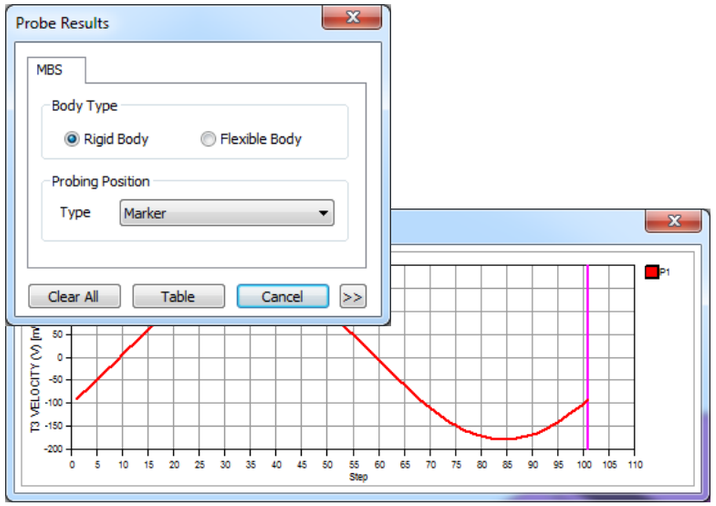
The developer explains the improvements in MBS
(Click to watch the video)

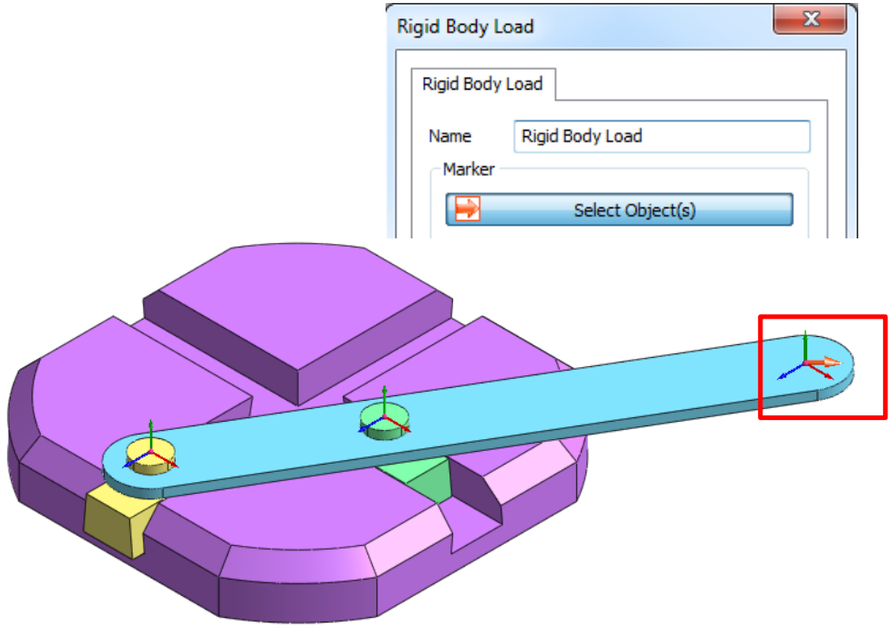


Step-by Step Tutorial about Multi-body Simulation
(Click here to watch the video)

MBS: Marker

The Marker is attached to a part and it moves with the part together. Load can be assigned directly to a marker in any point of a rigid body.





Sample Markers, Applied Force

Nonlinear elastic material data

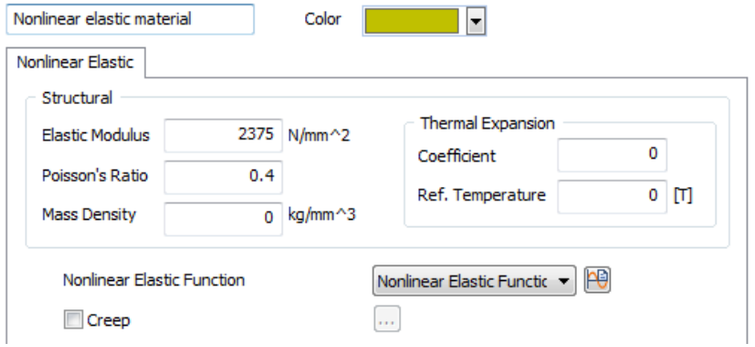
midas NFX 2015

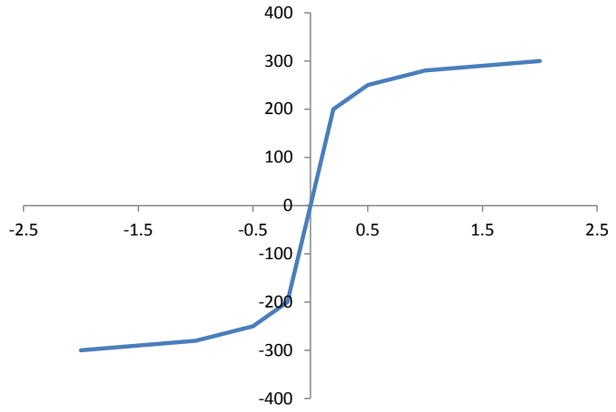
Media Resources

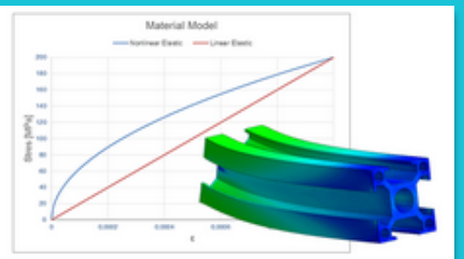
With this material model, you can now consider a multi-linear elastic uniaxial material relation.

The nonlinear stress-strain relationship is given by a multi-linear curve that is define by a set of points

The behavior is nonlinear but it is elastic







Nonlinear Elastic Material

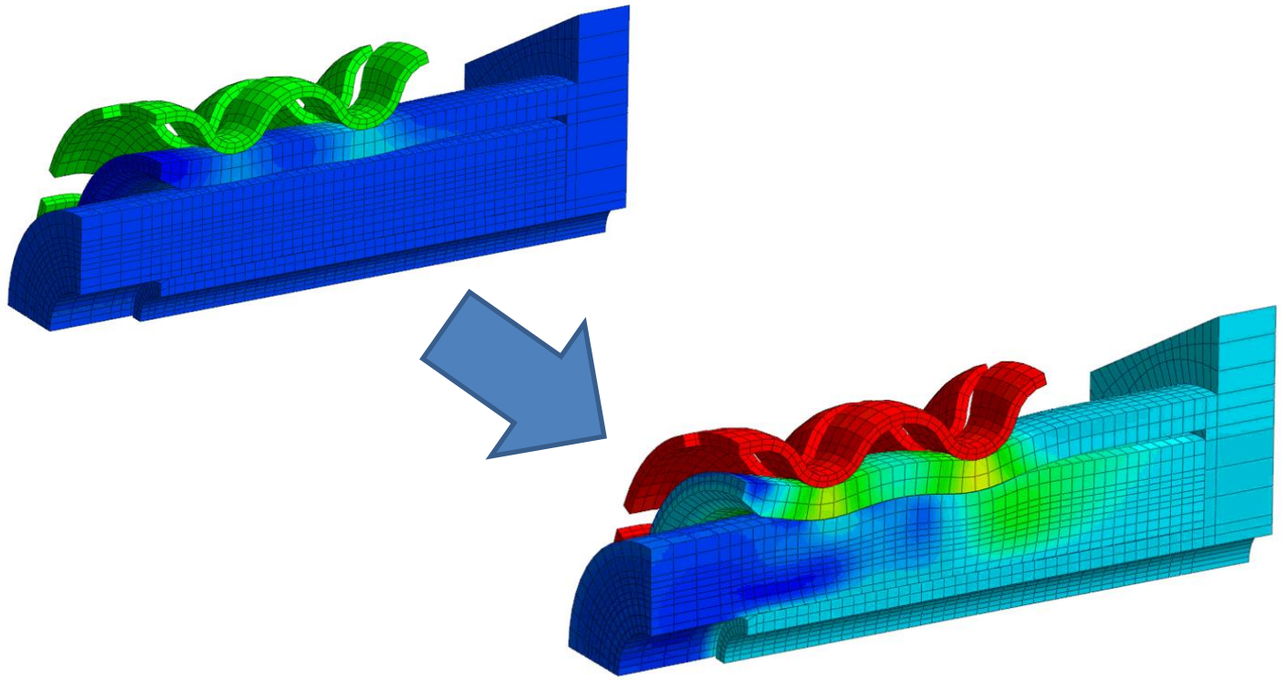
You can simulate nonlinear elastic material in NFX 2015. See how to do it in this example.

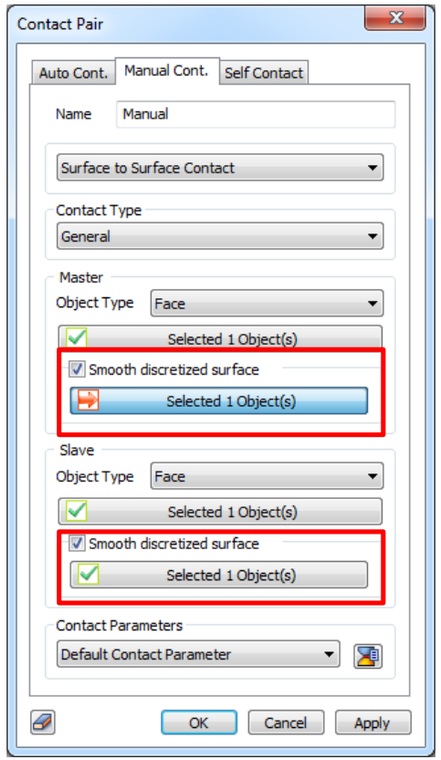
Try it in browser

Click to try the Interactive tutorial

Enhanced Contact Definition

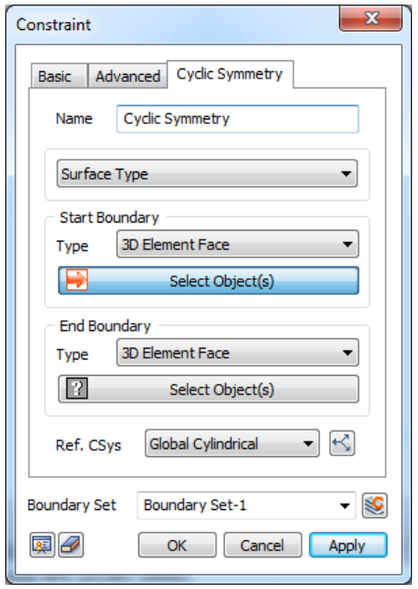
The convergence for models with contact discontinuity have been greatly improved by the addition of a smooth surface discretization surface parameter in the contact pairs.

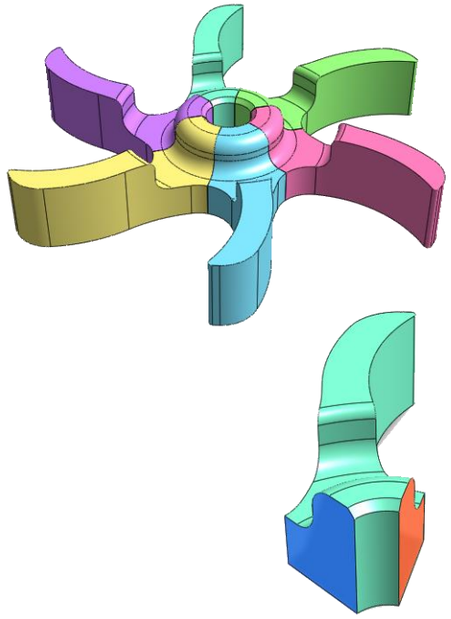




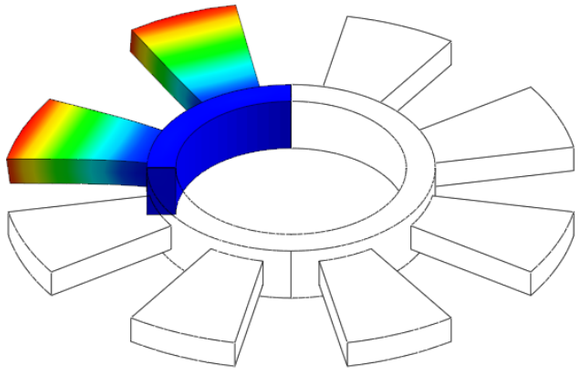
Cyclic Symmetry Constraint

A structure with a basic unit repeated around an axis can be described as exhibiting cyclic symmetry. This feature remove the need to model all the model which has a cyclic symmetry constraint.



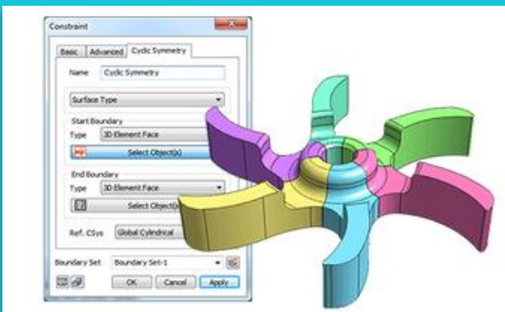


Cyclic Symmetry BC definition dialog box



Modal analysis result using cyclic symmetry constraints

Media Resources



Cyclic Symmetry Boundary Condition

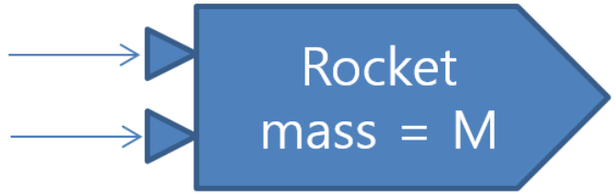
Many structures repeast around an axis (i.e. fans, turbines). For these structures, NFX 2015 can pattern geometries and loads cyclically, so you only need to model one small section to evaluate the behavior of the whole structure

Try it in browser

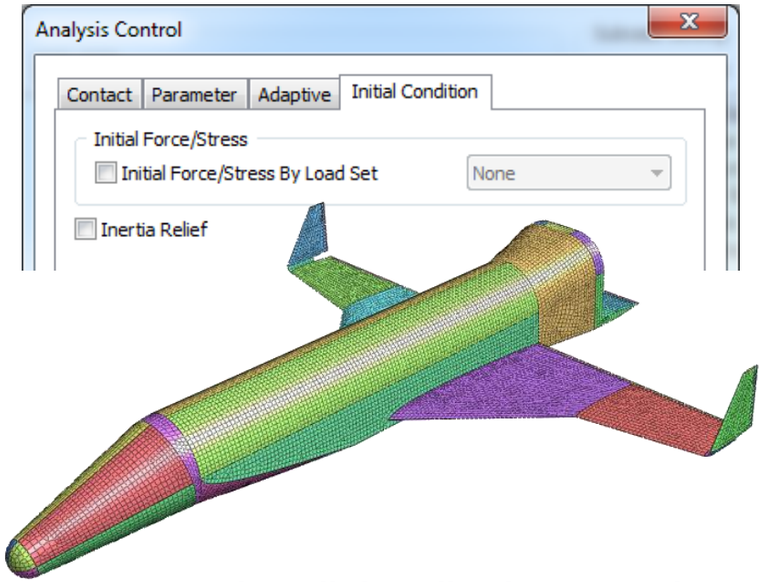
Click to try the interactive tutorial

Inertia Relief

Inertia relief option has been developed to enable the analysis of unconstrained systems such as air vehicles in flight, vehicles in motion, or satellites in space.

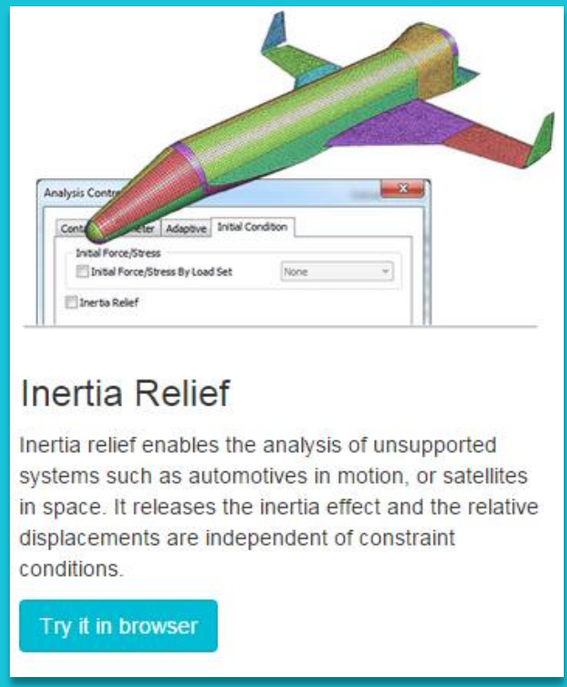


External Force F = Driving force (Reaction) → Acceleration : **a**



Inertia Relief application example

Media Resources



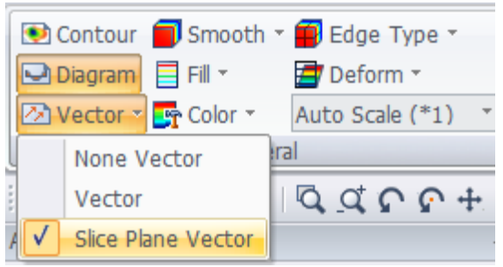
[Click to try the interactive tutorial]

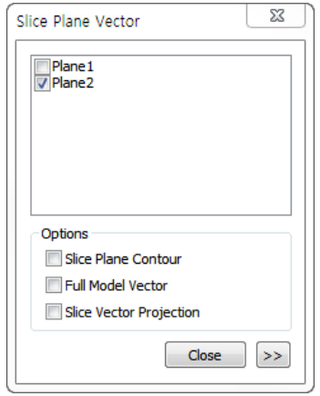
Post Processing: Slice plane Vector

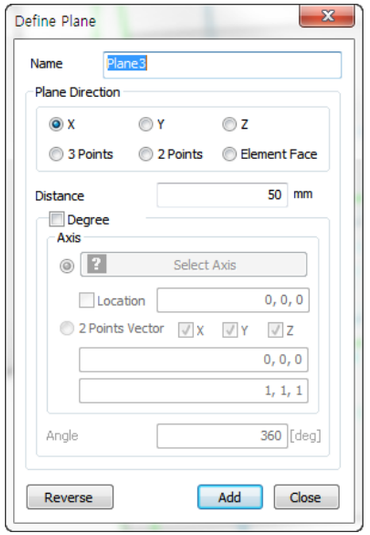
midas NFX 2015

Post-processing

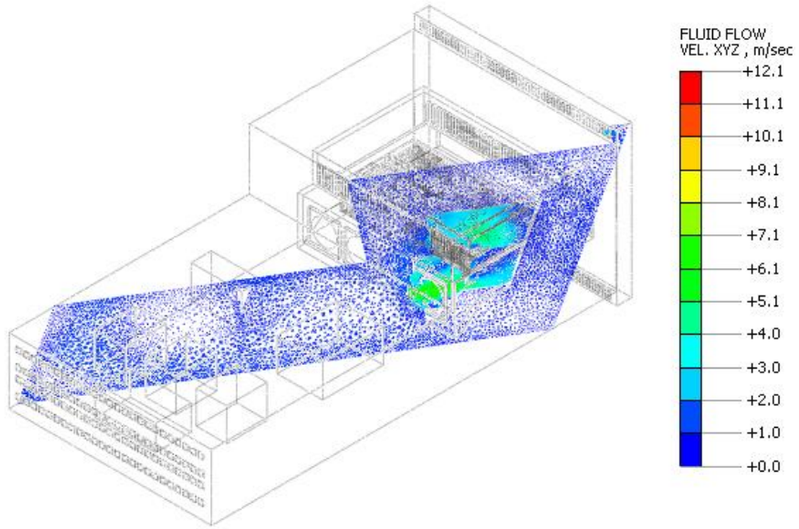
- Slice Plane Vector

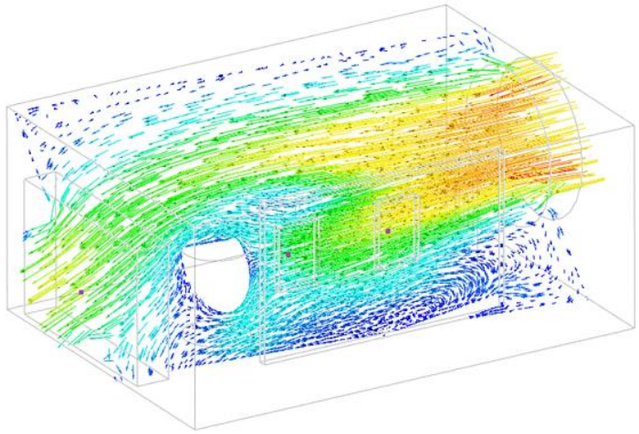






Access to feature





Slice Plane Vector – animated velocity vector result

CAD Interface upgrade

midas NFX 2015

The CAD model files supported by midas NFX have been extended. The detailed information appears in the table below:

※ The support of the latest CAD versions is updated constantly..

CAD format	Supported Versions
SolidWorks	98 – 2015
CATIA V4	4.1.9 – 4.2.4
CATIA V5	R6 – R24
Inventor	V11 – 2015
NX	11 – NX10
Creo (Pro/E)	16 – Creo 3.0
Solid Edge	V18 – ST7
Parasolid	10.0 – 26.0.151
STEP	AP203, AP214
IGES	Up to 5.3
ACIS	R1 – R25

< Additional improvements>

- The speed of the node/element selection tool has been improved for big models larger than 10 million mesh elements.
- The performance of the feature for showing or hiding large model elements has been improved.
- Opening speed of model files has been improved.
- The default settings for structural and CFD analysis have been changed. Some feature has been added to change in one click the basic settings for structural or CFD.
- A feature option called “Reload result” has been added to load automatically the results during analysis.

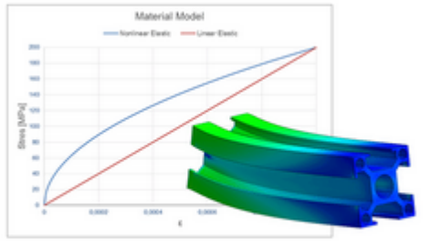
Watch the Replay of midas NFX 2015 Release Webinar

Click here to watch the replay of the webinar

Go to www.midasNFX.com/NFX2015

midas NFX 2015

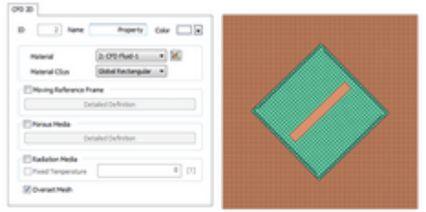
Get to know the developers



Nonlinear Elastic Material

You can simulate nonlinear elastic material in NFX 2015. See how to do it in this example.

Try it in browser



Overset Mesh

In complex fluid flow problems, not every geometry can be well represented using a single, contiguous mesh. NFX 2015 introduces overset mesh function. Try how it works in this example

Try it in browser

Try out new features with interactive tutorial

and More

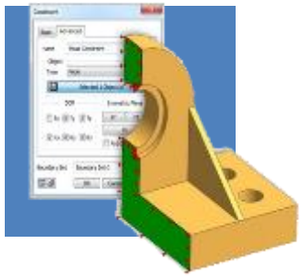
Accurate whenever you Need

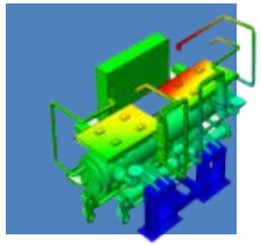
Be more efficient by focusing on the right details and get Accurate results

midas NFX 2015

Advanced Tools

Simple interface, with powerful and advanced tools



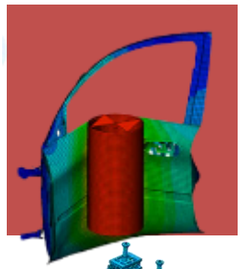


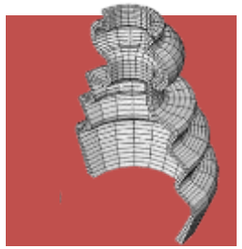
Right model from the beginning

Don’t waste your time with over-simplified models

Professional FEA

Advanced tools for professional FEA consultants



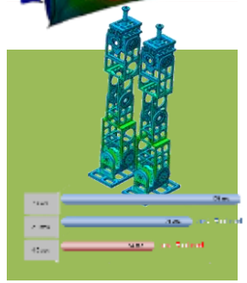


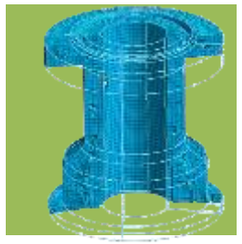
Control your Meshing

Every Meshing operation is possible

Top-level Solvers

Midas NFX all-in-one interface is unique





Meshing in your own way

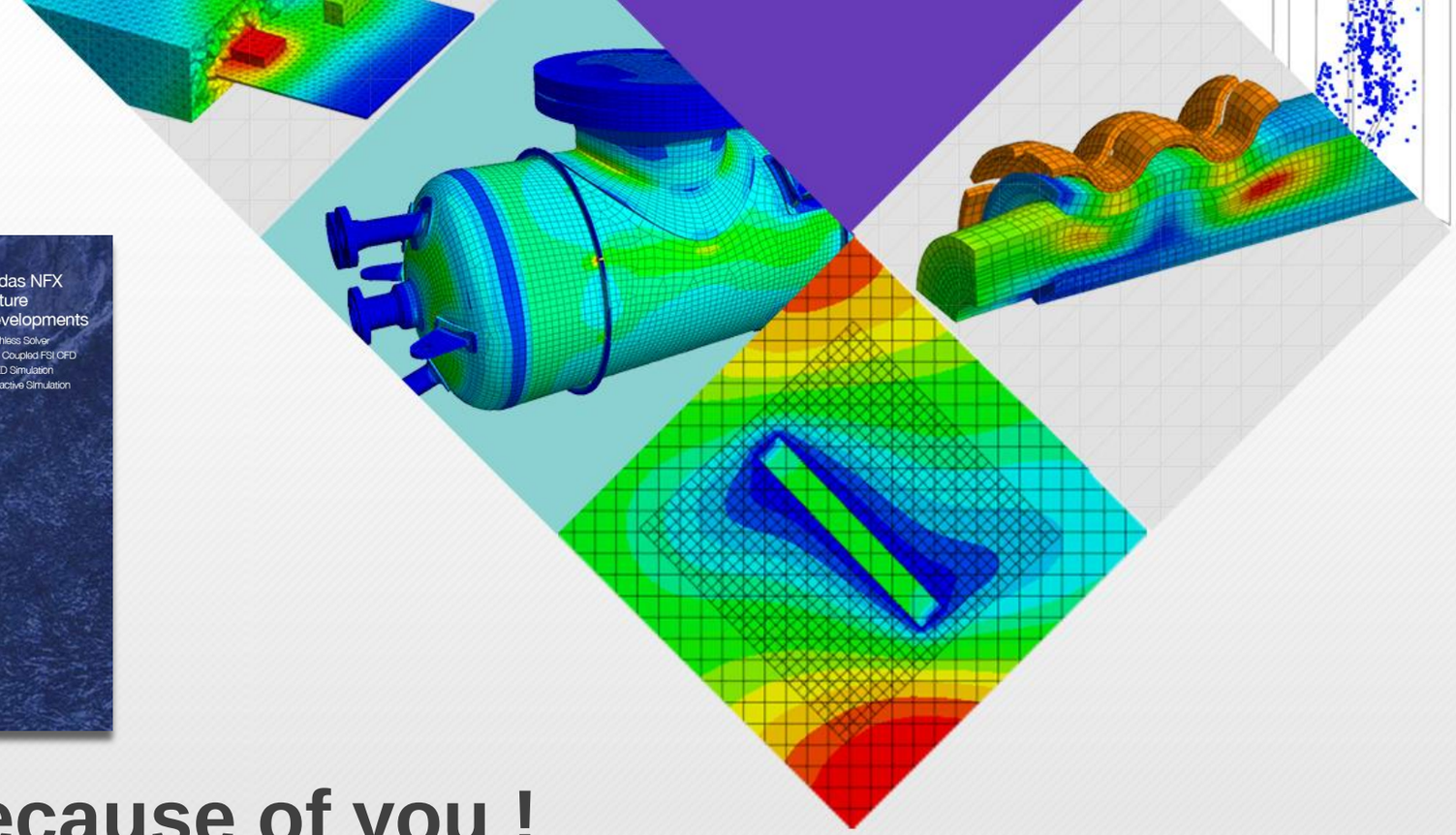
Hybrid? Tetra? Manual Meshing? Have it all

NAFEMS Verified

Results guaranteed from NAFEMS Benchmarks

Everything Faster

Multi-core meshing and GPU computation without any added cost.



Midas NFX is growing because of you !

Thank You for your support

midas NFX