

NX Advanced Thermal: Extend thermal analysis solutions

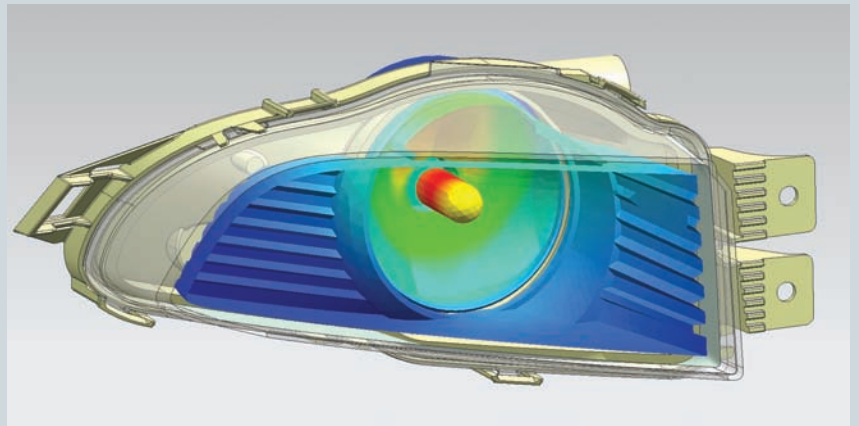
NX CAE

Benefits

- Extend thermal solution capabilities in NX Thermal and NX Electronic Systems Cooling
- Solve complex heat transfer phenomena with a comprehensive set of modeling tools
- Reduce costly physical prototypes and product design risk through high fidelity thermal simulation
- Gain further insight through coupled thermo-fluid multi-physics analysis using NX Advanced Thermal with NX Flow or NX Advanced Flow
- Leverage all the capabilities of the NX integrated environment to make quick design changes and provide rapid feedback on thermal performance

Summary

NX™ Advanced Thermal software extends the modeling and simulation capabilities of NX Thermal or NX Electronic Systems Cooling. NX Advanced Thermal provides a wide range of methods for advanced radiation analysis, radiative and electrical heating models, advanced materials models such as phase change, charring and ablation, as well as one-dimensional hydraulic network modeling. Thermo-fluid coupling is enabled with NX Flow and NX Advanced Flow, and thermo-elastic effects can be simulated by mapping temperature results to NX Nastran®.



NX Advanced Thermal adds a rich feature set to the powerful simulation technology of NX Thermal. Intended for tackling complex thermal physics and challenging thermal management problems, NX Advanced Thermal offers the same best-in-class level of integration within the NX preprocessing, postprocessing and simulation tools.

Applications of NX Advanced Thermal include simulation and analysis of a range of heat transfer problems in aerospace, automotive, electronics, power, process and other industries. NX Advanced Thermal offers the following additional features on top of the NX Thermal license.

NX

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NX Advanced Thermal

Advanced optical properties

- Specular reflectivity, diffuse and non-diffuse transmissivity, index of refraction, solid absorption
- Direction-dependent optical properties, BRDF
- Wavelength-dependent properties for nongray analysis

Advanced material models

- Ablation and charring models
- Electrical resistivity and Joule heating

Advanced radiation methods

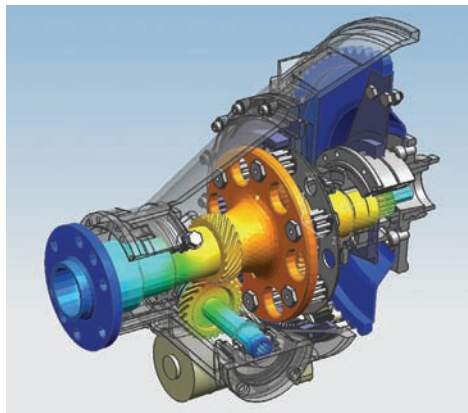
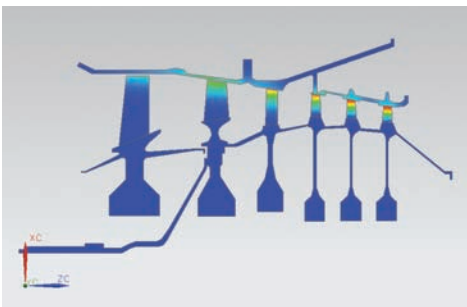
- Deterministic and Monte Carlo ray tracing
- Nongray multiband radiative heat transfer

Radiative heating

- Solar heating with atmospheric and albedo flux models
- Radiative source definition, collimated or diffuse, spectrum-dependent, time and spatially varying flux

1D hydraulic network modeling

- 1D flow modeling using duct networks
- Ability to simulate convection to and from 1D duct networks
- Film cooling model
- Linear or exponential advection discretization



Advanced thermal couplings

- Perfect contact
- One-way conductances
- Free and forced correlation-based convection couplings
- Convective gap couplings
- User-defined couplings
- Cyclic symmetry couplings

Articulation and motion modeling

- Any combination of translational motion and rotational joints
- Time-dependent radiation and thermal couplings
- Postprocessing of articulated mesh

Thermal control devices

- Peltier cooler models
- Active heater controllers, PID controllers

Open architecture

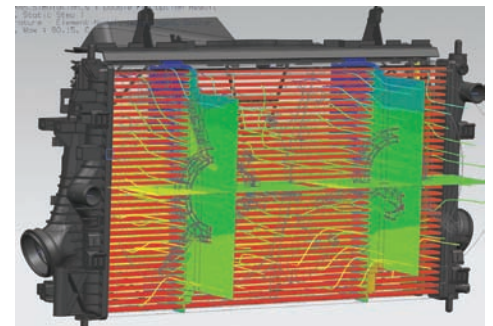
- Full access to thermal system equations
- Incorporation of external models
- Enhanced solution control
- User subroutines for integration of custom code in the solution sequence

Parallelized radiation solver

- Parallel view factor calculations and thermal solver multi-threading for solution efficiency
- The NX Advanced Thermal product includes access to up to 8 cores on one machine for the supported solver modules
- The available NX Thermal/Flow DMP add-on removes any software limitations on the number of cores and enables network and cluster support
- Distributed memory (MPI) based parallelization for highly scalable computation of view factors and radiative heating – available with the NX Thermal/Flow DMP add-on

Supported hardware/OS

NX Advanced Thermal is an add-on module to either NX Advanced FEM or NX Advanced Simulation. It requires a license of NX Thermal as a prerequisite. All standard NX hardware/OS platforms are supported (including Windows, Linux and selected 64-bit platforms). Contact Siemens PLM Software for any other specific hardware/OS support requests.



You can conduct coupled thermo-flow analysis without the need to transfer data between multiple software tools.

Contact
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