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Ingenuity for life

NX Motion

Simulating complex motion behavior

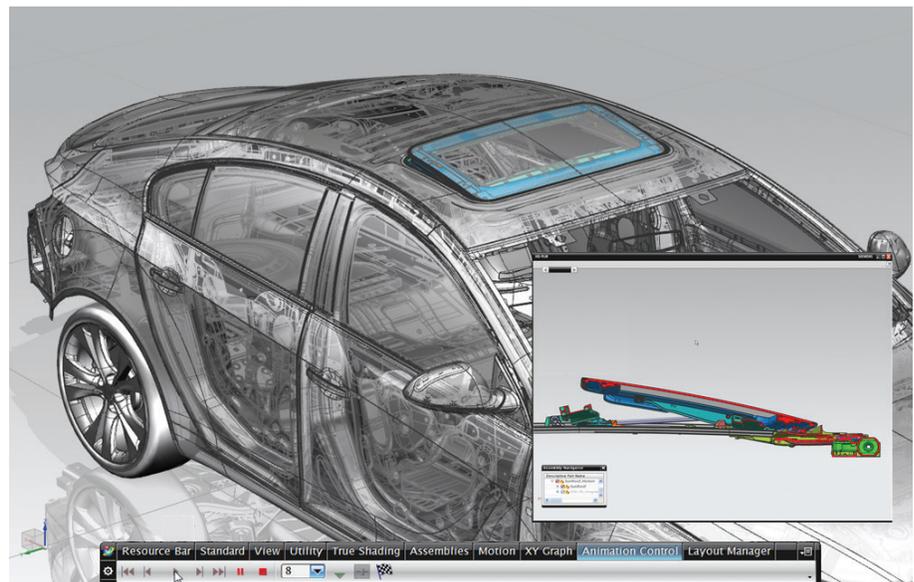
Benefits

- Reduce costly physical prototypes by using motion simulation to understand product performance
- Enable designers or engineers to investigate assembly performance earlier in the development process
- Accelerate product development by enabling rapid evaluation and optimization of product alternatives
- Gain insight into product performance by animating, graphing and comparing reactions, velocities and accelerations
- Eliminate the need to transfer data to an external application; the motion model is synchronized with the current design, sharing the same geometric data
- Collaborate with structural analysis through direct load transfer to NX Advanced FEM or NX Advanced Simulation
- Leverage existing NX investments and the integrated environment to lower training costs due to a common interface

Summary

NX™ Motion software helps designers and engineers predict and understand the functional behavior of parts and assemblies. It delivers a complete and very robust set of capabilities to support all aspects of advanced dynamic, static and kinematics motion simulation. The early use of performance simulation is key to the evaluation of design options. It increases design confidence and reduces risk, thus enabling transformation of the design process.

NX Motion delivers an advanced yet simple-to-use solution that allows designers and engineers to understand, evaluate and optimize the complex motion behavior of assemblies and products. It provides a complete solution for kinematics and dynamic motion analysis of rigid multi-body as well as static equilibrium. NX Motion is fully integrated with (and leverages the modeling and assembly capabilities of) the NX Design portfolio. All geometric models are supported, from simple sketch to complex assemblies, allowing top-down and bottom-up approaches, supporting models from multiple CAD sources via JT™ data format and other direct translation capabilities. When integrated within the Teamcenter® software product suite, NX Motion



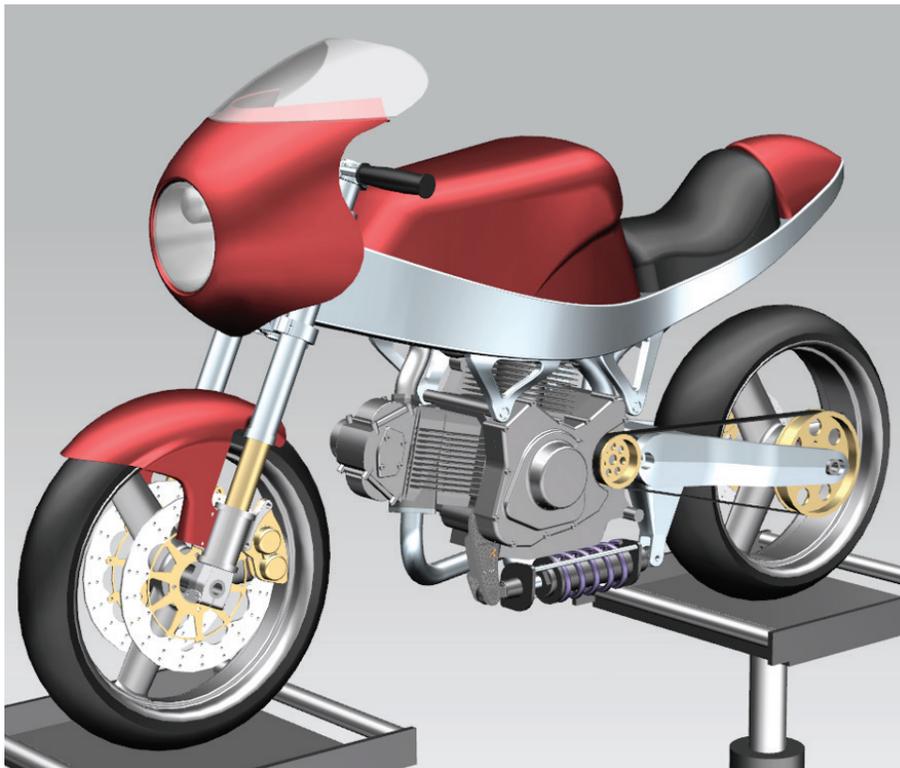
NX Motion handles complex dynamic simulations such as sunroof mechanisms.

NX Motion

helps a user track models and results as well as enables team communication. Users can rapidly evaluate multiple (and concurrent) design alternatives at all phases during the design process within a consistent NX interface.

Simulation capabilities

- Moving objects or links are defined from the master model (CAD data) or generated from within the NX Motion model itself. They remain associative with the geometric objects and the user can override the mass properties as needed. Initial velocity is also allowed
- Motion modeling tools include multiple mechanical joints, constraints, springs, dampers, bushings and contacts in 2D and 3D
- Movement is activated by one or more of the following: motion drivers, applied forces, torques or gravity
- Body-to-body contact capabilities simulate contact and interaction between components within the analysis process
- Motion drivers and loads are easily defined using an NX integrated function builder; and graphing is open to functional expressions and timetables
- Functions and resultant graphs are stored in a separate file (.afu), thus allowing reuse of function definition and sharing of data between multiple motion models
- Simulation results show real-time behavior of a product. Available results include clearance checking, graphs, movie output, animation and spreadsheet-driven articulation as well as a load transfer facility for structural simulation



Perform multi-body dynamics on real CAD geometry.

NX integration

- Assembly to motion: CAD assembly defined with mating conditions can be directly mapped to a motion model consisting of links and joints
- Motion to assembly: the positions and orientations of the CAD assembly, subassemblies and components can be defined directly from within NX Motion
- Positions, mass properties, orientations of all motion data are in synch with any data model modifications
- Any geometric expression can be modified locally in the motion model for "what-if" studies without changing the CAD master model
- Expand motion simulation capabilities beyond rigid bodies to include flexible body analysis through the available Flexible Bodies Dynamic Solution module
- Integrate control systems into motion simulations through co-simulation with MATLAB/Simulink via the NX Motion Control Simulation add-on

PLM integration

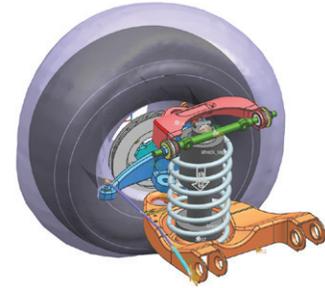
- Within Teamcenter, the motion model is a specific object attached to the CAD master model item revision. The motion data remains in synch with the design revision and assembly BOM
- All files from the motion solver are attached to the motion model for tracking and later review of results
- A direct export utility allows sharing a lightweight representation of the geometry and the animation within Teamcenter
- Users can integrate the solution with Excel to extract data or drive the motion model
- NX Motion Simulation models can be exported in PLM-XML format for use within Tecnomatix Process Simulate Kinematics

NX openness for automation and customization

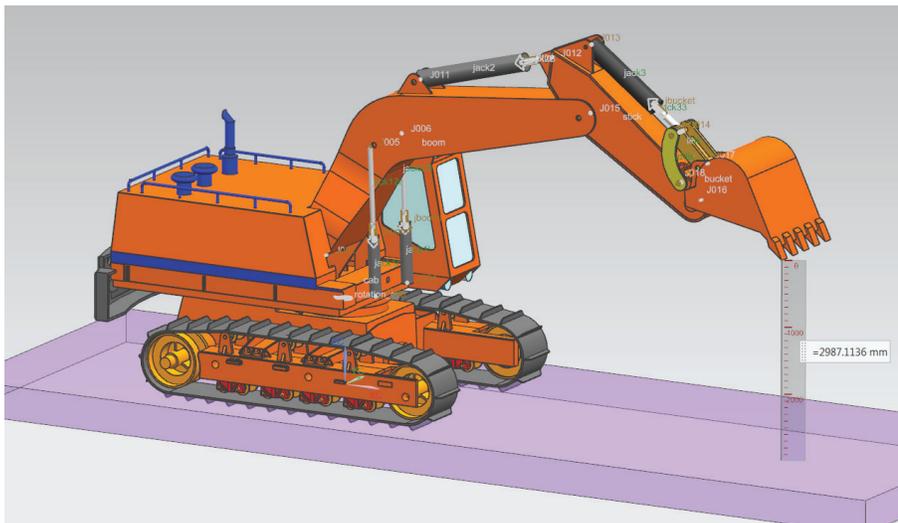
- NX Knowledge Fusion: automated applications like optimization can be easily achieved. Supported motion objects include links, markers, joints, springs, dampers, bushings, contacts, packaging functionalities, animation, function and graphing results
- NX Open: all NX Motion functionalities are supported

Product availability

NX Motion is an add-on module within the NX digital product development portfolio. It requires a core seat of NX Design as a prerequisite. NX Motion is available on most major hardware platforms for Windows and Linux.



Create motion envelopes to design for package space.



Measure distances between geometry to understand clearances.

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