

COSMOSMotion Overview

POWERFUL, EASY-TO-USE PHYSICS-BASED MOTION SIMULATION FOR SOLIDWORKS® USERS

COSMOSMotion™ allows both designers and engineers alike to perform motion analysis directly from the SolidWorks interface, eliminating intermediary setup steps. Tight integration with COSMOSWorks® enables users to design, simulate, and analyze a mechanical assembly in a single, seamless operation.



By performing physics-based motion simulation of motorized assemblies, COSMOSMotion generates behavior data such as contact forces and friction.

COSMOSMotion simulates the mechanical operations of motorized assemblies and the physical forces they generate. By determining factors such as power consumption and interference between moving parts, COSMOSMotion helps you ascertain if your designs will fail, when parts will break, and whether or not they will cause safety hazards.

Leverage the power of SolidWorks. COSMOSMotion works inside SolidWorks window and uses existing assembly information to build motion simulation studies.

- Automatic mapping of SolidWorks mates to derive motion joint conditions
- Automatic transfer of material properties defined in SolidWorks
- Re-use physical simulation data in COSMOSMotion for realistic physics-based motion simulation

Transfer loads seamlessly. With the seamless transfer of loads from COSMOSMotion to COSMOSWorks, you can visualize stress and displacements, on a component, at a single time instance or for the entire simulation cycle.

Simulate real-world operating conditions. By combining physics-based motion with assembly information from SolidWorks, COSMOSMotion can be used in a broad span of industry applications.

- Estimate peak motor torque when performing tasks like positioning antenna reflectors, opening and closing security gates, handling materials, and raising and lowering scissors-type lift tables. Also see how friction can increase power requirements and actuator size.
- Understand robotics performance during operation, for example, installing windshields, pick and place electronic components on circuit boards in electronics plants.
- Optimize or minimize the force imbalance of a rotating system in orbital sanders, sewing machines, shaker beds, drive-shafts, etc.
- Change the design length of backhoe linkages to provide better digging performance.
- Generate CAM curves (profiles) employed in automatic feed mechanisms and screw machines.
- Represent interactions between various gears (spurs, worm, helical, and rack-and-pinion) used in different kinds of power transmission or motion control.
- Perform basic suspension tuning for racing applications.



Motion loads and joint forces can be seamlessly transferred from COSMOSMotion to COSMOSWorks to perform stress analysis.

Primary industries served

- Machine Design
- Electro-mechanical
- Automotive
- Consumer Products
- Heavy Equipment
- Aerospace
- Medical
- Off-Highway
- Entertainment

Visual Basic® and C++® API support

- OLE automation to customize motion inputs and results visualization

Supported languages

- Simplified Chinese
- English
- French
- German
- Italian
- Japanese

System requirements

- SolidWorks 2007 or higher
- Microsoft® Windows XP Professional (32-bit and 64-bit)
- Intel® Pentium®, Intel Xeon™, Intel EM64T, AMD Athlon™, or AMD Opteron™ - based processor
- 512 MB RAM or greater
- Pointing device
- CD-ROM drive
- Internet Explorer version 6.0 or later

Associate physics-based models to engineering conditions. COSMOSMotion offers several types of joint and force options to represent real-life operating conditions.

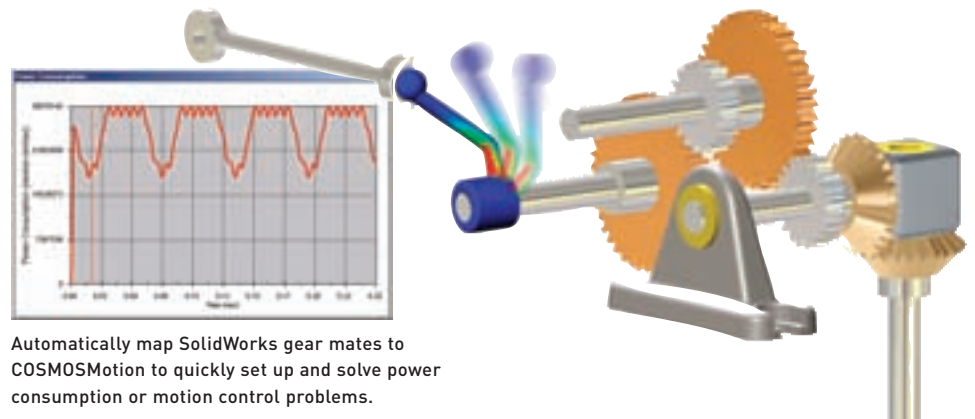
- Create various compound joints to represent conditions like hinge, screw, spherical, cylindrical, planar, and universal.
- Construct joint primitives to enforce standard geometric constraints.
- Use action-only force to control the acceleration rate and velocity when designing actuators.
- Apply constant, harmonic, data points (spline), and step-forcing functions to joints and forces.
- Create joint couplers (kinematic gears) to allow motion between various types of gears for power transmission.
- Define linear and non linear springs in applications lacking torsional and flexural rigidity when extended.
- Represent action/reaction forces and moments.
- Use point-to-curve and curve-to-curve (with static and dynamic friction) to represent CAM constraints.
- Define 3D contacts (with static and dynamic friction) to capture interaction between two or more contacting parts.
- Use isotropic or orthotropic bushings to give flexibility to mechanical joints.
- Include the effect of gravity.

Interpret results with powerful and intuitive visualization tools. Once you have completed the motion simulation run, COSMOSMotion offers a variety of results visualization tools that allow you to gain valuable insight into the performance of your design.

- Create XY plots of numerical data for the entire simulation cycle.
- Represent multiple XY plots in the same graph.
- Display displacement, velocity, acceleration, and force vectors at joint locations.
- Display the trace of any point of the body during simulation and generate a reference curve directly on a SolidWorks part.
- Compare plots for different designs to allow you to build up a history of information on how results vary within the assembly.
- Check for colliding parts while the assembly moves.
- Animate a representation of the 3D spring during simulation.

Collaborate and share analysis results. COSMOSMotion makes it easy to collaborate and share analysis results effectively with everyone involved in the product development process.

- Use COSMOSMotion AVI, eDrawings® or VRML formats to capture and communicate the physical motion to others.
- Generate graphs with numerical data in Microsoft Excel format in any coordinate system.
- Export graphs using a different reference frame (part).



Automatically map SolidWorks gear mates to COSMOSMotion to quickly set up and solve power consumption or motion control problems.

SolidWorks Corporation
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com

Europe Headquarters
Phone: +33 4 42 15 03 85
Email: infoeurope@solidworks.com

Japan Headquarters
Phone: +81 3 5447 8080
Email: infojapan@solidworks.com

Asia/Pacific Headquarters
Phone: +65 6511 9188
Email: infoap@solidworks.com

Latin America Headquarters
Phone: +55 11 3186 4150
Email: infoa@solidworks.com

COSMOS®