Dynamic Motion Simulation in CATIA® V5

OVERVIEW
With SimDesigner for CATIA V5 integrated solutions, CATIA V5 users benefit from the world’s leading Simulation and Virtual Product Development (VPD) technology from inside their CATIA V5 environment. SimDesigner Motion enables you to understand how your product design performs in the design phase, reducing the cost of manufacturing hardware prototypes and testing.

HOW DO YOU KNOW THE DESIGN WILL ACTUALLY WORK?
CATIA’s Digital Mock-Up (DMU) Kinematics product allows you to understand whether the parts will fit together and how they move with respect to each other. But how do you know the design will actually work taking into consideration real-world dynamic effects? SimDesigner Motion is intended for designers and engineers who need to verify the performance aspects of mechanisms including those containing cams, gears, latches, belts, linkages, motors, and chains.

DESIGN, SIMULATION, AND RESULTS VISUALIZATION
SimDesigner Motion automatically converts CATIA assembly constraints into motion model constraints. To complete the motion model, SMO allows you to add other required constraints, contacts, forces, and actuators. The mechanism motion is simulated using the embedded functionality of the MSC.ADAMS solver. The results can be verified and validated with 3D animation, results measures, interference checking, XY plots, which provide you with in-depth knowledge of how the mechanism works. Results such as displacement, velocity, acceleration and reaction loads, power consumption, kinetic energy, potential energy, and momentum can be calculated and plotted.

The load history resulting from the motion analysis can be transferred directly to your finite element model in SimDesigner Linear. In addition, to further study the influence of flexible components within your design, SimDesigner Flex (SDF) module can also be added to your CATIA V5 environment.

BENEFITS
• Further leverage your CATIA V5 product design synthesis investment to improve productivity of your simulation process through seamless integration with the CATIA V5 PLM environment
• Improve your product design and performance while shortening design schedules with the use of dynamic motion simulation early in the development process
• Increase collaboration levels between designers, engineers, and analysts through easy exchange of models and data
• Reduce product design, development, manufacturing, and warranty costs with MSC.Software’s generative products that enable you to implement a virtual product development environment
**ADDITIONAL PRODUCT FEATURES**

**GEOMETRY**
- Wireframe, Surface, and Solids
- Associated to Motion Model
- Automatic Mass Properties Calculation
- Substitute Rigid Bodies with Flexible Bodies

**JOINTS**
- Joints Converted from Assembly Constraints
- Joint Friction Support
- Revolute Joints with One Rotational DOF
- Cylindrical Joints with One Rotational and One Translational DOF
- Spherical Joints with Three Rotational DOFs
- Universal Joints with Two Rotational DOFs
- Translational Joints with One Translation DOF
- Planar Joints with Two Translational and One Rotational DOF
- Fixed Joints with All DOFs Restrained
- Screw Joints, Rotary to Linear Motion
- Rack and Pinion Joints, Rotary to Linear Motion
- Constant Velocity Joint
- In-Line Joints
- In-Plane Joints
- Parallel Axis Joints
- Perpendicular Joints
- Joint Orientation
- Joint Couplers
- Bushings

**MOTION GENERATORS**
- Joint Motions

**SIMULATION**
- Kinematics and Dynamics

**CONTACT**
- Static and Dynamic Friction

**RESULTS**
- Point-On-Curve Constraint
- Curve-To-Curve Constraint
- Curve-To-Curve 2D Contact
- General 3D Contact

**FORCES**
- Linear and Torsion Springs
- Nonlinear Springs
- Linear and Torsion Dampers
- Nonlinear Dampers
- Action-Only and Action-Reaction Forces and Moment

**CALCULATED RESULTS**
- Constant, Harmonic, Step, Spline / Test Data
- MSC.ADAMS Functions
- Animation
- Output to AVI
- Moving-Interference Checking
- Export Data to Spreadsheet
- Measures of Angles and Minimum Distance
- Point Trace Curves
- Coupler (Trace) Curves
- Linear and Angular Displacement
- Velocity and Acceleration
- Reaction Forces and Moments
- External Results Plotting – Single / Multiple Plots

**INTERFACES**
- ADAMS/View

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