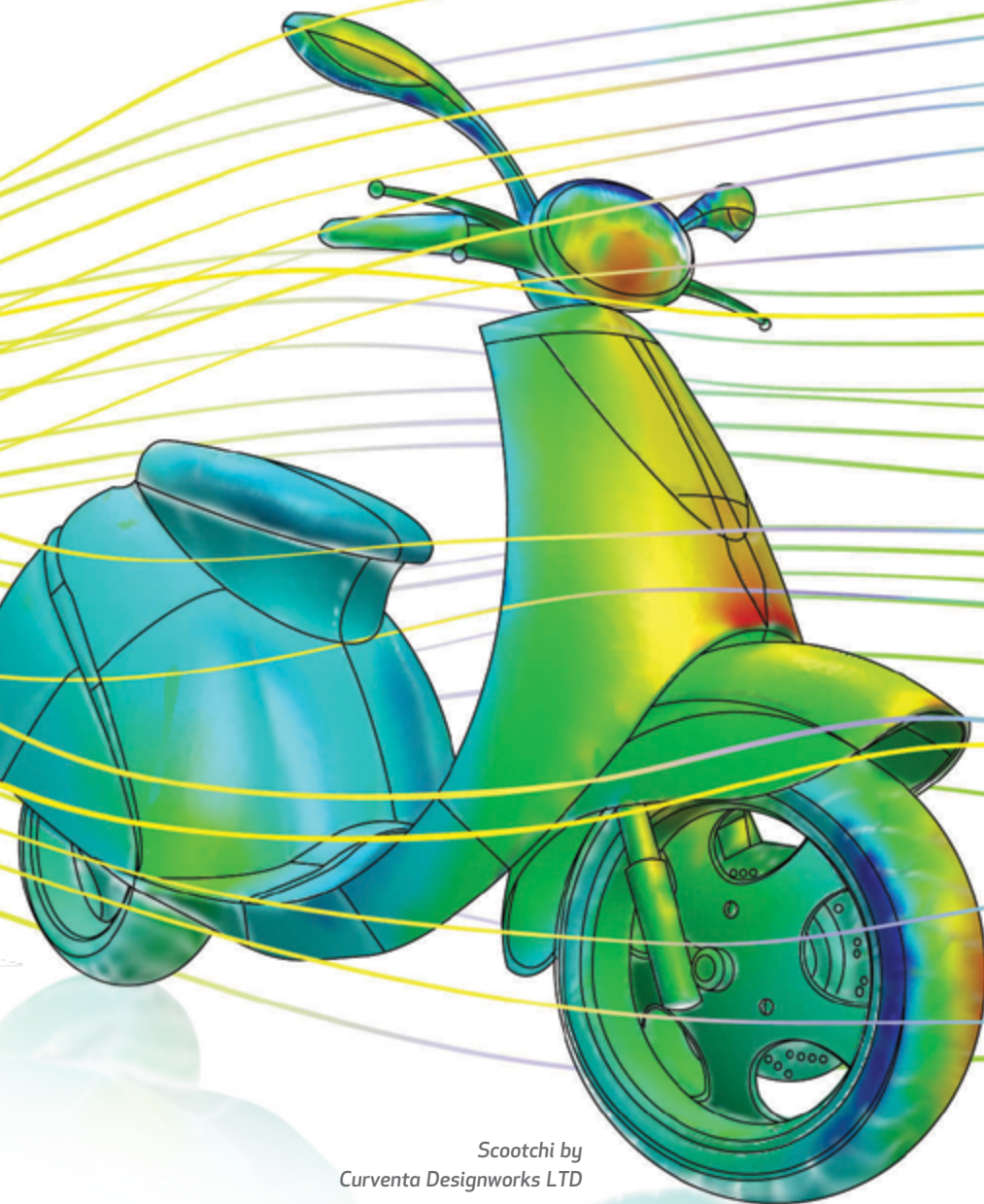


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# SOLIDWORKS SIMULATION

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Innovation is about taking chances, not taking risks



*Scootchi by  
Curventa Designworks LTD*

# SOLIDWORKS SIMULATION PREMIUM

Design better products with a comprehensive simulation tool

Simulating the real-world response of your design has never been easier. With the full-featured suite of tools in SolidWorks® Simulation Premium, you can reduce the number of assumptions required in a world that is rarely linear or static.

SolidWorks Simulation Premium software bolsters the depth and the ease of use of SolidWorks Simulation Professional with additional capabilities, including a powerful set of tools for simulating nonlinear and dynamic response as well as composite materials.

## Capture the effects of large displacements on your designs:

- Examine the large deformations caused by overloads, contact, and flexible materials
- Transition easily between linear and nonlinear simulations
- Study nonlinear buckling and snap-through events

## Simulate products made with nonlinear materials:

- Investigate designs with hyperelastic materials, such as rubbers, silicones, and other elastomers
- Conduct an elasto-plastic analysis to study the onset of yield as well as plastic deformation
- Examine creep effects and material changes with temperature

## Perform dynamic analyses of parts and assemblies:

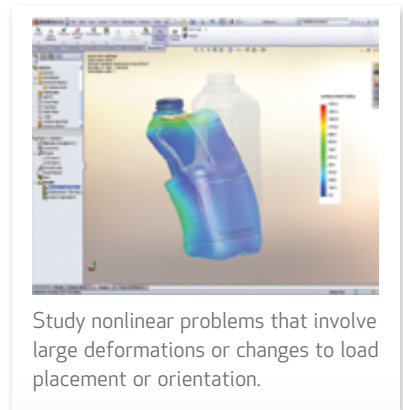
- Simulate time history loading, steady-state harmonic input, response spectrum, and random vibration excitations
- Input excitation curves of forces in random vibration analysis
- Study stress, displacement, velocity, and acceleration with time, as well as RMS and PSD values for stress, displacement, velocity, and acceleration

## Simulate composite materials:

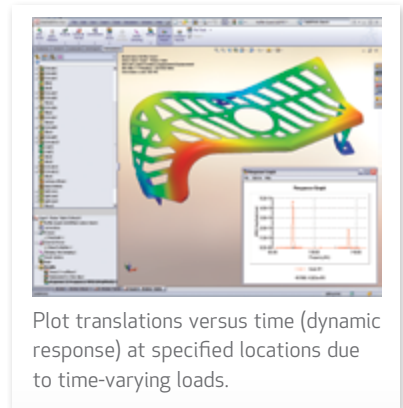
- Utilize simulation to leverage these advanced materials used in an increasing number of products, from consumer goods to advanced aerospace structures
- Study multilayer shell bodies to examine the effect of each layer with its own material properties, thickness, and orientation
- Use the revolutionary user interface to dynamically control and display ply orientation directly on your SolidWorks model
- Utilize sandwich and graphite or carbon-fiber composites, including honeycomb and cellular foam

## Easily tackle complex problems with the 2D planar simplification tool:

- Create plane stress, plane strain, and axisymmetry nonlinear analysis
- Use 3D CAD models without modification to generate 2D sections



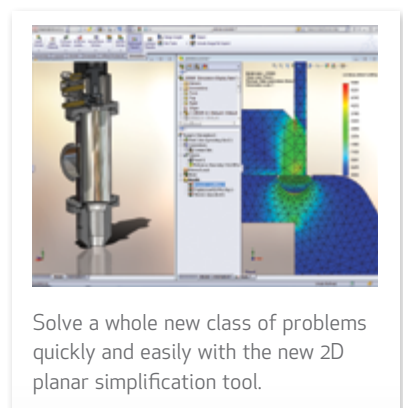
Study nonlinear problems that involve large deformations or changes to load placement or orientation.



Plot translations versus time (dynamic response) at specified locations due to time-varying loads.



Validate the performance of composite materials, including stiffness and ply failure results.



Solve a whole new class of problems quickly and easily with the new 2D planar simplification tool.

# SOLIDWORKS SIMULATION PROFESSIONAL

Perform virtual testing and analysis of parts and assemblies

SolidWorks® Simulation Professional extends the capabilities of SolidWorks Simulation, so you can expand your virtual testing environment to evaluate the longevity of your design. It also allows you to measure complex load scenarios.

## Study and optimize assemblies of all sizes:

- Evaluate forces and stresses between contacting parts, including friction
- Use connectors or virtual fasteners to model bolts, pins, springs, and bearings
- Bond components with clearances or gaps, without modification
- Apply bearing loads, forces, pressures, and torques
- Use Trend Tracker and Design Insight plots to drive optimal changes as you work
- Create plane stress, plane strain, and axisymmetry linear static analysis

## Simulate drop tests using your parts or assemblies:

- Calculate acceleration loads, stresses, and displacements as the components hit the floor or each other

## Analyze assembly motions for process and task workflow with event-based simulation:

- Utilize the entirely new user interface to define motion studies based on model event
- Trigger actions through new motion sensors, time, or the completion of a previous task
- Gain greater control of model actuators with the new servo motors

## Understand the effects of temperature changes on parts and assemblies:

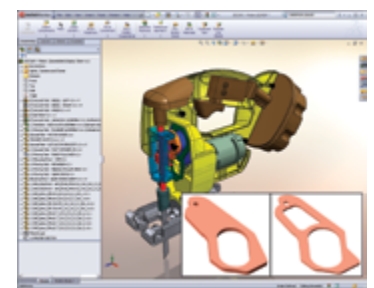
- Study conduction, convection, and radiation heat transfer
- Utilize isotropic, orthotropic, and temperature-dependent material properties

## Simulate vibration or buckling in your designs:

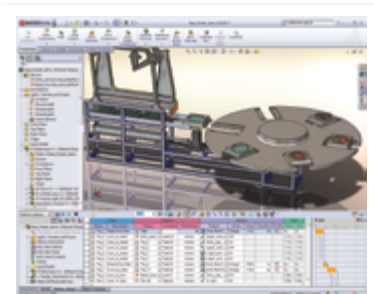
- Examine how vibrating or unstable modes can shorten equipment life and cause unexpected failures
- Assess the effects of stiffening under external load on frequency or buckling response

## Study the effects of cyclic loading on product life:

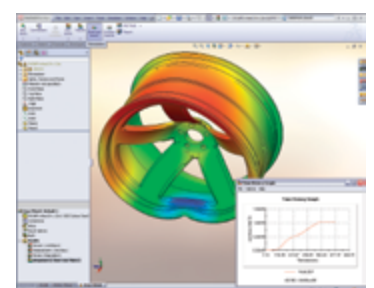
- Check a system's expected life or accumulated damage after a specified number of cycles
- Import load history data from real physical tests to define loading events



Minimize the material usage or weight of your designs using shape optimization technology.



Virtually prototype the most challenging machines with event-based motion simulation.



Study stress, velocity, and acceleration on objects dropped from different heights and orientations.



Use peak loads from testing or SolidWorks Motion to estimate the life of critical components.

# SOLIDWORKS FLOW SIMULATION

Easily simulate liquid and gas flow within SolidWorks

SolidWorks® Flow Simulation software is a powerful computational fluid dynamics (CFD) tool that enables you to quickly and easily simulate fluid flow, heat transfer, and fluid forces that are critical to the success of your design.

## Access a broad range of physical models and capabilities:

- Examine flow through your components, over your components, or both via a combination of internal and external flows
- Couple flow with thermal analysis, simulating convection, conduction, and radiation effects
- Let SolidWorks Flow Simulation find the best dimensions or inlet and outlet conditions that satisfy your design goals, such as force, pressure drop, or velocity
- Include sophisticated effects like porosity, cavitation, and humidity
- Solve flow problems involving non-Newtonian fluids, such as blood and plastic
- Simulate the rotation of impellers and fans using rotating coordinate frames

## Leverage an unlimited combination of real-world operating conditions:

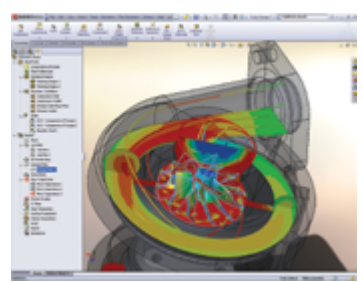
- Apply inlet velocities, pressures, mass or volume flow rates, and fans
- Simulate temperature changes by applying a surface or volume heat source, and accounting for solar radiation
- Track the behavior of particles suspended in a flow
- Apply time- and coordinate-dependent boundary conditions and heat sources

## Gain valuable insights with powerful and intuitive results visualization tools:

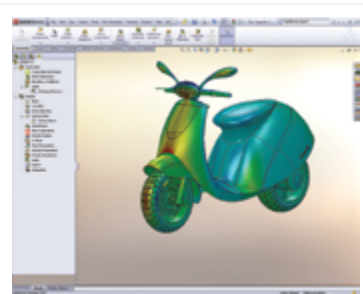
- Utilize section plots to study the distribution of results quantities, including velocity, pressure, vorticity, temperature, and mass fraction
- Measure results at any location with the Point Parameter tool
- Graph results variation along any SolidWorks sketch
- List results and automatically export data to Microsoft® Excel
- Examine the flow trajectory inside or around the model with animated bands, 3D arrows, pipes, or spheres

## Solve large-scale problems quickly and efficiently with two vertical solutions: Electronics Lab and HVAC

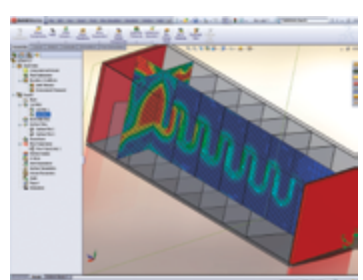
- Electronics Lab evaluates components' thermal properties and cooling requirements. Includes Joule heating simulation, two-resistor component compact module, heat pipe compact module, and PCB generator
- HVAC Module evaluates air and gas movement in working and living environments. Includes advanced radiation modeling, comfort parameters, and a large database of building materials



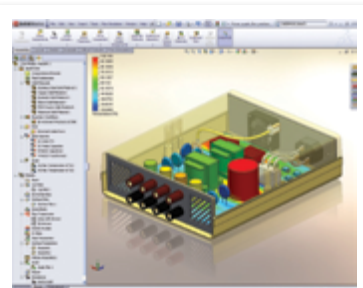
Simulate complex flow problems, such as this turbo charger with rotating parts.



Visualize complex flow results, such as flow trajectories, section plots, and surface plot data.

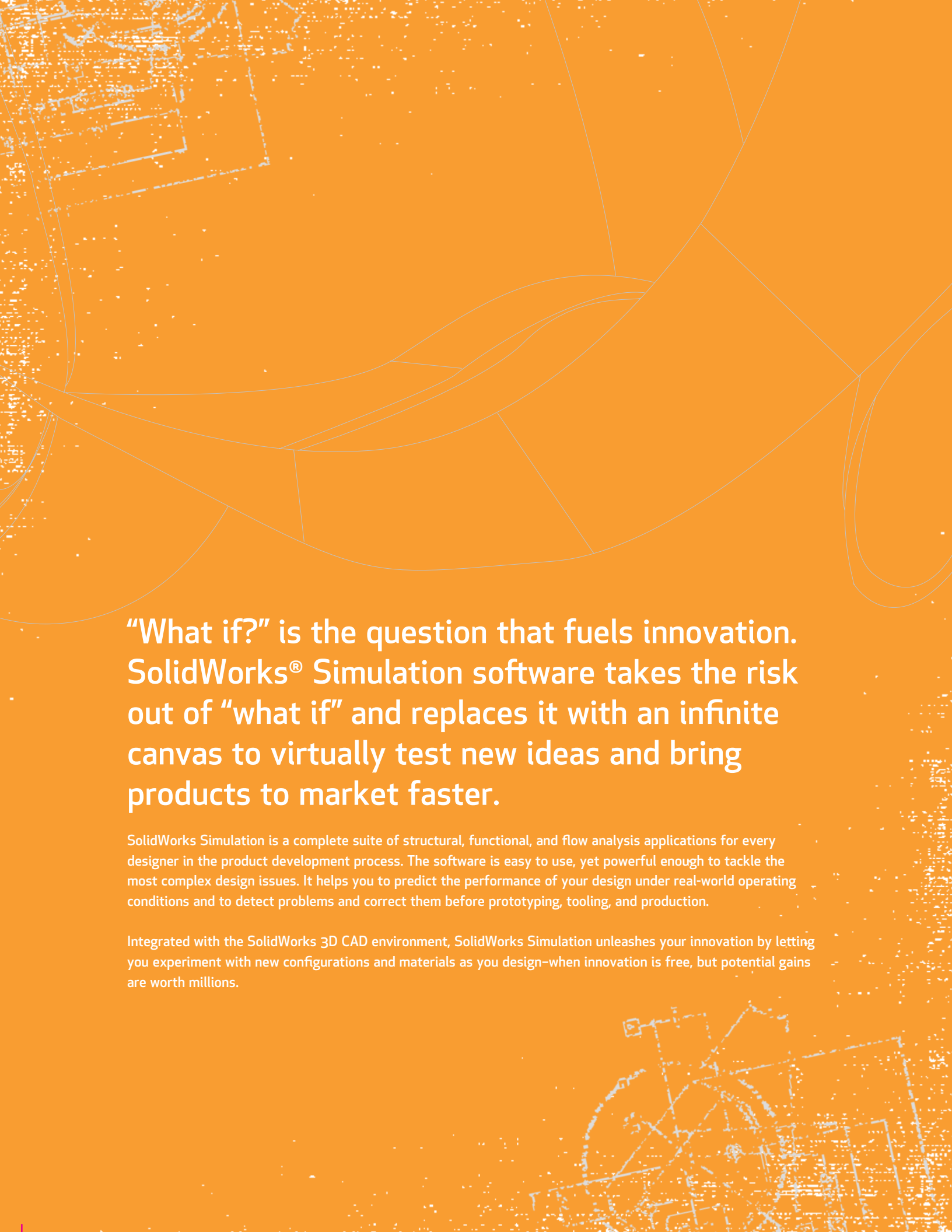


View results for velocities, temperatures, and pressures, and probe the section for results at any location.



Access predefined and validated attributes for electronic parts in design.





**“What if?” is the question that fuels innovation. SolidWorks® Simulation software takes the risk out of “what if” and replaces it with an infinite canvas to virtually test new ideas and bring products to market faster.**

SolidWorks Simulation is a complete suite of structural, functional, and flow analysis applications for every designer in the product development process. The software is easy to use, yet powerful enough to tackle the most complex design issues. It helps you to predict the performance of your design under real-world operating conditions and to detect problems and correct them before prototyping, tooling, and production.

Integrated with the SolidWorks 3D CAD environment, SolidWorks Simulation unleashes your innovation by letting you experiment with new configurations and materials as you design—when innovation is free, but potential gains are worth millions.

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