The Basics of COMSOL Multiphysics® in 18 Minutes
What Is Multiphysics?

The world is multiphysics in nature.

**Multiphysics**  
- Coupled physical phenomena in computer simulation.  
- The study of multiple interacting physical properties.

The ability to fully couple physics phenomena in a model enables highly accurate numerical simulations that closely mimic real-world performance.
COMSOL Multiphysics®
One software environment, any engineering field.

A modeling and simulation platform that provides fully coupled multiphysics and single-physics modeling capabilities.

**Single Physics**
Model phenomena and processes in different engineering and physics fields in one integrated environment, with the same principal workflow for all areas.
Add one physics phenomenon at a time and couple when you want.

**Multiphysics**
Couple two or more physics phenomena that affect each other.
There are no limitations for which and how many phenomena are coupled.
A Look at the COMSOL® Software

The structure of the user interface (UI) is always the same regardless of the engineering application and physics phenomena.
SOFTWARE DEMONSTRATION

Thermal Actuator

Joule heating and thermal expansion

- Electric currents
- Heat transfer
- Solid mechanics
Problem Definition and Physics Settings

**Geometry**
- Hot arms
- Anchors
- Cold arm
- Dimple

**Electric Currents**
- Ground
- Applied voltage

**Heat Transfer**
- Joule heating
- Fixed temperature

**Solid Mechanics**
- Thermal expansion
- Fixed
- Roller
Go from the geometry to the model results in an easy-to-follow workflow for creating multiphysics models.
CLOSER LOOK AT THE Application Builder

Create custom-made simulation apps based on multiphysics models.

Design the app UI so that users can change the model settings that are relevant to the task at hand.
Closer Look at Apps

Extend the value of modeling and simulation to a larger group of engineers and scientists, within or outside of your organization.
Model Manager

Manage models and simulation apps in a structured workspace for collaboration between colleagues and teams.
COMSOL MULTIPHYSICS®

The platform product for simulating real-world designs, devices, and processes. One user interface for all engineering applications.

- MODEL BUILDER: Combine physics phenomena in one model
- APPLICATION BUILDER: Build simulation apps from models
- MODEL MANAGER: Collaborate and organize models and apps

COMSOL Compiler™
Compile simulation apps into executable files. Run them freely on any computer.

COMSOL Server™
Host and administrate your simulation apps. Run them through a web interface.

ADD-ON PRODUCTS

ELECTROMAGNETICS
- AC/DC Module
- RF Module
- Wave Optics Module
- Ray Optics Module
- Plasma Module
- Semiconductor Module

STRUCTURAL & ACOUSTICS
- Structural Mechanics Module
  - Nonlinear Structural Materials Module
  - Composite Materials Module
  - Geomechanics Module
  - Fatigue Module
  - Rotordynamics Module
- Multibody Dynamics Module
- MEMS Module
- Acoustics Module

MULTIPLY USE
- Optimization Module
- Uncertainty Quantification Module
- Material Library
- Particle Tracing Module
- Liquid & Gas Properties Module

INTERFACING
- LiveLink™ for MATLAB®
- LiveLink™ for Simulink®
- LiveLink™ for Excel®
- CAD Import Module
- Design Module
- ECAD Import Module
- LiveLink™ for SOLIDWORKS®
- LiveLink™ for Inventor®
- LiveLink™ for AutoCAD®
- LiveLink™ for Revit®
- LiveLink™ for PTC® Creo® Parametric™
- LiveLink™ for PTC® Pro/ENGINEER®
- LiveLink™ for Solid Edge®
- File Import for CATIA® V5
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