

Introduction to CST Studio Suite

CORE Module 2022



3DEXPERIENCE[®]



About this Course

Course objectives

Throughout this course you will become familiar with the CST Studio Suite interface and how to perform basic tasks in terms of modeling, setup of simulation, and analyzing pre and postprocessing results.

This course will also briefly discuss the various high frequency solvers available in CST Microwave Studio and provide a behind-the-scenes look at the FIT and FEM algorithms.

Targeted audience

Electromagnetic Simulation Analysts

Prerequisites

None



1 day

Day 1

- ▶ Lesson 1 Introduction
- ▶ Lesson 2 Basic and Advanced Modeling Techniques
- ▶ Lesson 3 Solver Overview

- ▶ Workshop 1 Coaxial Connector Simulation

- ▶ Lesson 4 Ports, Materials and Boundaries
- ▶ Lesson 5 High Performance Computing

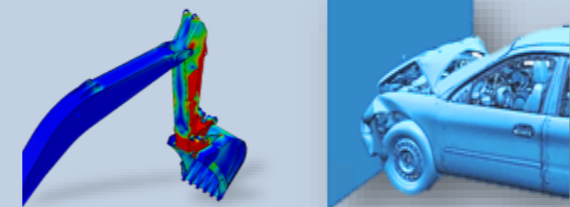
- ▶ Workshop 2 Microstrip Power Splitter **OR**
- ▶ Workshop 3 PCB Board Level EMC Simulation

- ▶ Lesson 6 Results Handling and Postprocessing
- ▶ Lesson 7 Optimizer Overview

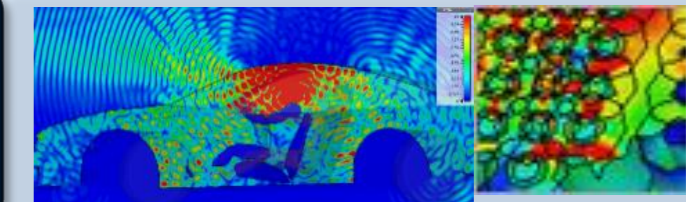
SIMULIA

- ▶ SIMULIA is the Dassault Systèmes brand for realistic simulation solutions.
- ▶ Advanced simulation portfolio covering simulation disciplines such as structural mechanics, computational fluid dynamics and electromagnetic field simulation, for a true multiphysics simulation approach.

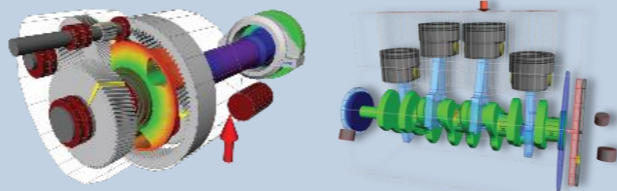
Structures



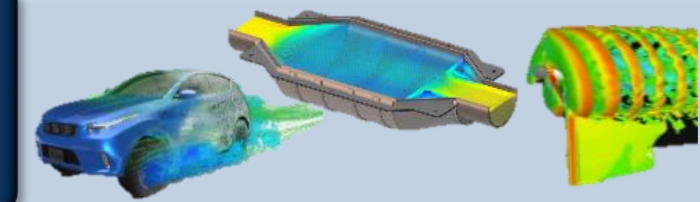
Electromagnetics



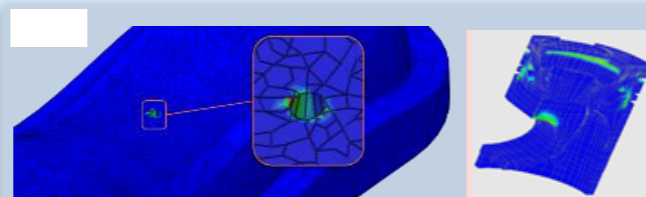
Multibody



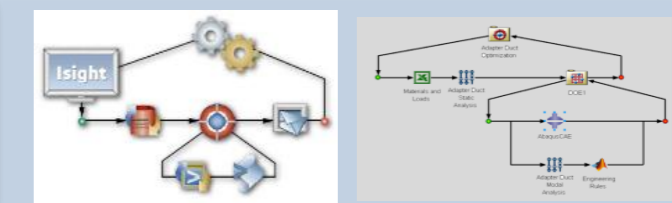
Fluids



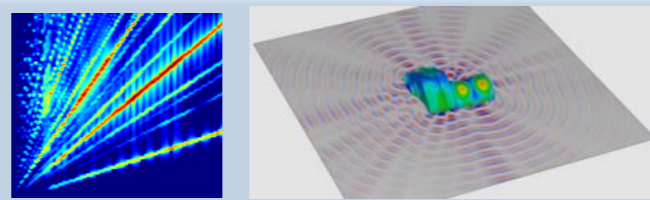
Durability



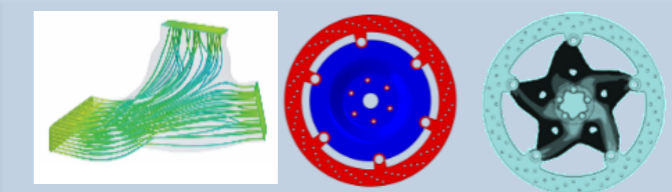
Automation



Vibro-acoustics



Optimization



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The SIMULIA Community is the place to be.

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If you do not already have a 3DS Passport, you can [register now](#). An account is free and access is instant.



Join the conversation

Start a discussion with other members of the SIMULIA Community. Talk through your burning simulation questions with peers, SIMULIA experts and SIMULIA Champions. Apply to be an author to create posts, share useful tips you've discovered for SIMULIA software and establish yourself as a thought-leader. The SIMULIA Community is home to both SIMULIA product users across the world, and to SIMULIA subject matter experts.

Stay up to date on the latest news

Modern industry trends change rapidly, and SIMULIA is always developing its products to stay ahead. Follow the SIMULIA Community to be informed of new product releases and updates to the Knowledge Base, and to receive links to articles and blog posts about the latest industry trends.



Browse e-learning resources

The SIMULIA Community brings together learning materials covering numerous applications for SIMULIA products. Read a whitepaper on the benefits of simulation in your work, discover tips and tricks for using SIMULIA software efficiently, or watch a demonstration of how to use simulation to achieve your goals.

SIMULIA Training

<https://www.3ds.com/products-services/simulia/training/>



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Revision Status

Lesson 1	11/21	Updated for CST Studio 2022
Lesson 2	11/21	Updated for CST Studio 2022
Lesson 3	11/21	Updated for CST Studio 2022
Lesson 4	11/21	Updated for CST Studio 2022
Lesson 5	11/21	Updated for CST Studio 2022
Lesson 6	11/21	Updated for CST Studio 2022
Lesson 7	11/21	Updated for CST Studio 2022
Workshop 1	11/21	Updated for CST Studio 2022
Workshop 2	11/21	Updated for CST Studio 2022
Workshop 3	11/21	Updated for CST Studio 2022

Lesson 1: Introduction

Lesson content:

- ▶ The SIMULIA Brand
- ▶ SIMULIA Electromagnetics Product Portfolio
- ▶ Help Mechanisms



15 minutes

Lesson 2: Basic and Advanced Modeling Techniques

Lesson content:

- ▶ CST Microwave Studio Workflow
- ▶ Basics
- ▶ View Options
- ▶ Short Exercise – Construct Objects
- ▶ Component Library
- ▶ Curves
- ▶ Short Exercise – Sweep Curve
- ▶ Moving & Copying
- ▶ Advanced Modeling Tools
- ▶ Short Exercise – Create Cone Structure
- ▶ Picks – Advanced
- ▶ CAD Import Handling

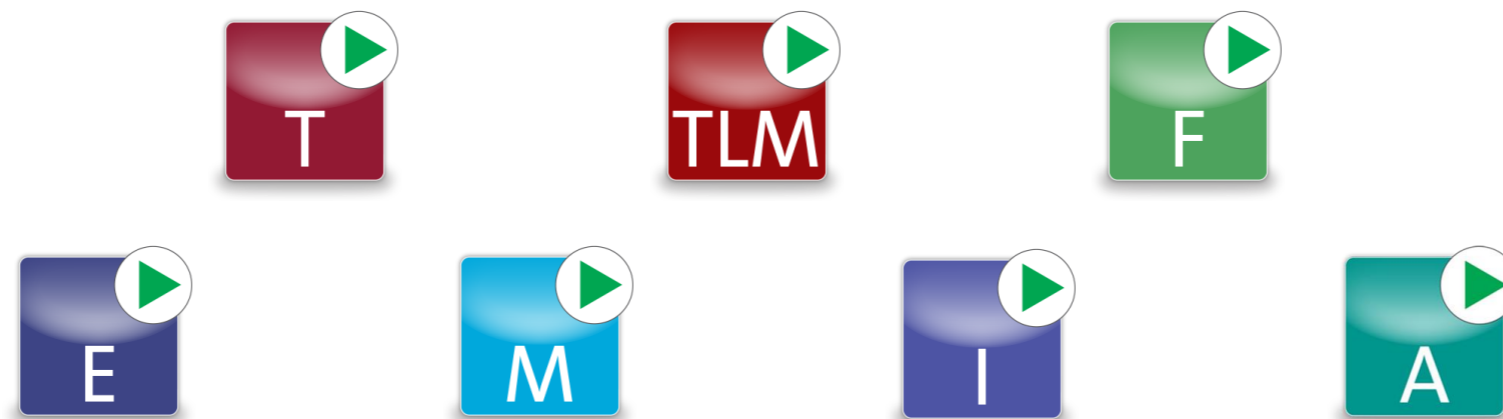


90 minutes

Lesson 3: Solver Overview

Lesson content:

- ▶ CST Microwave Studio Solver Overview
- ▶ Selecting the Most Appropriate Solver
- ▶ Simulation Attributes
- ▶ CST Time and Frequency Domain Solvers
- ▶ Time Domain Simulation
- ▶ Time Domain vs. Frequency Domain
- ▶ Frequency Domain Simulation
- ▶ Adaptive Meshing
- ▶ CST Microwave Studio Solvers
- ▶ Hybrid Solver Task
- ▶ Workshop 1: Coaxial Connector Simulation



40 minutes

Workshop 1: Coaxial Connector Simulation

This workshop demonstrates the construction of a parameterized coaxial connector model and how to set up a simulation using the Time Domain solver. The structure's performance is enhanced through the use of the built-in optimizer tool. The losses obtained from the optimized EM simulation are then used to perform thermal and mechanical studies.

Part 1: Construction and Simulation

Part 2: Optimization

Part 3: Thermal Analysis

Part 4: Mechanical Analysis



90 minutes

Lesson 4: Ports, Materials and Boundaries

Lesson content:

- ▶ Ports
 - Ports for S-Parameter Computation
 - Discrete Ports
 - Waveguide Ports
- ▶ Materials
 - Material Library
 - Creating A New Material
 - Normal Materials
 - Metals
 - Surface/Transfer Impedance Models
- ▶ Boundary Conditions
 - Boundary Types
 - Symmetry Planes



40 minutes

Lesson 5: High Performance Computing

Lesson content:

- ▶ Acceleration Methods
- ▶ Multithreading Scalability
- ▶ GPU Computing — Typical Performance
- ▶ Distributed Computing
- ▶ MPI Computing
- ▶ Reference Documentation
- ▶ CST Job Control Center (JCC)
- ▶ Workshop 2: Microstrip Power Splitter
- ▶ Workshop 3: PCB Board Level EMC Simulation



20 minutes

Workshop 2: Microstrip Power Splitter

This workshop illustrates some advanced modeling features together with some special solver settings for transient simulation and adaptive mesh refinement. The results of a time-domain simulation are compared with those of a frequency-domain simulation.

Part 1: Construction and Simulation

Part 2: Adaptive Meshing

Part 3: Optimization

Part 4: Time-domain vs. Frequency-domain Simulation



This Workshop is optional.
Choose Workshop 2 or 3.



80 minutes

Workshop 3: PCB Board Level EMC Simulation

The aim of this workshop is to learn about the use of schematic building blocks to create 3D models for simulation.

Part 1: Signal Trace Over Slot

Part 2: Emission from a Net Near Reference Edge



This Workshop is optional.
Choose Workshop 2 or 3.



70 minutes

Lesson 6: Results Handling and Postprocessing

Lesson content:

- ▶ CST Microwave Studio Workflow
- ▶ Results Handling
- ▶ Result Access via Python
- ▶ 1D Plot Options
- ▶ Result Navigator
- ▶ 2D/3D Plot Options
- ▶ Postprocessing Templates



30 minutes

Lesson 7: Optimizer Overview

Lesson content:

- ▶ Motivation
- ▶ Setup
- ▶ Monitoring Progress
- ▶ High Performance Computing (HPC) Parallelization
- ▶ General Suggestions
- ▶ Optimizer Demonstration



40 minutes