

Coupling Tutorial OptiY[®] – COMSOL Multiphysics[®]

OptiY GmbH - Germany





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COMSOL Step1: Define Global Parameters

Model Builder	👬 Settings	📗 Model Library 🏶	Material Browser	2 - 6
 StaticBar_Model.mph (root) Elobal Definitions 	Pi Parame	ters		
Pi Parameters ▲ Model 1 (mod 1)	▼ Parameters			
▲	Name	Expression	Value	Description
a= Variables 1	Width	1.03683001[mm]	0.01037 m	
Arr Maximum 1 (maxop1)	High	5.13022000[mm]	0.00513 m	
Boundary System 1 (sys1)	Length	1.01154002[mm]	0.1012 m	
⊳ View 1 ⊳ \ Geometry 1				
Bolid Mechanics (solid)				
i Mesh 1 ⊳ 🕞 Study 1				
a 🛅 Results				
Data Sets	合 🕂 🐱			
▲ 8.85 e-12 Derived Values	Name			
8.85 e-12 Global Evaluation 1	Ivanie.			
8.85 e-12 Global Evaluation 2				
I ables	Expression:			
D Plot Group 1				
Report	Description:			
inchoir				

Pham Slide 2



COMSOL Step 2: Build Geometry and Set Material

Use the defined parameters for building the model geometry and setting the material properties to get a parameterized model



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COMSOL Step 3: Define Variables for the Model

T Model Builder	iii Settings	🚻 Model Library 🏶 Mat	erial Browser		2 - D			
StaticBar_Model.mph (root)	a= Variables							
Global Definitions Propostors								
Model 1 (mod 1)	Geometric Sc	Geometric Scope						
∠ ■ Definitions	Geometric entity level: Entire model							
a= Variables 1								
August Maximum 1 (maxop1)	▼ Variables	▼ Variables						
5 Boundary System 1 (sys1)	Name	Everacion	Unit	Description				
View 1	MayDisp	expression maxon1(solid disp)	m	Description				
Materials	MaxMises	maxop1(solid mises)	N/m ²					
Solid Mechanics (solid)	IVIGATVISCS	maxopr(sona.miscs)	14/111					
B Mesh 1								
b 🛞 Study 1								
a 🛅 Results								
Data Sets								
Base Clobal Evaluation 1								
8.85 Global Evaluation 2								
b III Tables								
b 🔁 3D Plot Group 1	Name							
> E 3D Plot Group 2	Indire.							
💐 Report								
	Expression:							
	Description:							



COMSOL Step 4: Setting Study and Computing



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COMSOL Step 5: Define Derived Values

T Model Builder	👬 Settings 🔛 M	lodel Library 🏶 Material Bro	wser = 🗕 🗖 🗖	
▲ 10 StaticBar_Model.mph (root)	👫 Global Eva	luation		Design Evaluation:
 ✓ Stattedul_Modelinitions Pi Parameters ✓ Model 1 (mod1) ✓ Definitions a= Variables 1 ✓ Maximum 1 (maxop1) ✓ Boundary System 1 (sys1) ✓ View 1 ✓ View 1 ✓ Geometry 1 ✓ Materials ✓ Solid Mechanics (solid) ✓ Study 1 ✓ Results ✓ Data Sets ✓ Sig Global Evaluation 1 	Data Data Data set: Expression Expression: MaxDisp Unit: m Description:	Solution 1	▼ ↓ ↓	 Volume Integration Surface Integration Line Integration Point Evaluation
	Description: Parameters			Global Evaluation: based on the defined model variables
8.85 e-12 Global Evaluation 2	Name	Value	Description	model variables
D Tables	solid.refpntx	0	Reference px component	
3D Plot Group 2	solid.refpnty	0	Reference py component	
Report	solid.refpntz	0	Reference pz component	
	▼ Data Series Ope	ration		
	Operation:	None	•	



COMSOL Step 6: Evaluate All Derived Values in one Table

Results Data Sets	Expression:			Messages	🚥 Progress 🗐 Res	ults 🛿 🕺 🕌 🛦 🗙 🏑 🕞 🖽 👻 🗖
Bala Sets A 8.85 Derived Values	Unit:			MaxDisp (m)	MaxMises (N/m^2)	Export
 ▲ \$.55 Derived Values ▲ \$.55 Global Evaluation 1 <	Unit: ate cate e Delete le me F2 erties mic Help F1	New Table Table 1 - Global Evaluation 1 (MaxDisp) Value Description 0 Referencomponent 0 Referencomponent 0 Referencomponent	¢	MaxDisp (m) 0.0041	MaxMises (N/m^2) 2.0622e8	Export Evaluate all derive values in one table
	Exp to a	ort the table text file (e.g. <mark>Results.tx</mark>	t)	<pre>% Model: % Versic % Date: % Table: % MaxDis 0.004096</pre>	n: p (m) 222910633273	COMSOL 4.1.0.185 May 13 2011, 09:59 Table 1 - Global Evaluation 1 (MaxDisp) MaxMises (N/m ²) 2.06215840477051E8



COMSOL Step 7: Save The Model to Java File

			import com.comsol.model.~;
File	Edit Options Help		<pre>import com.comsol.model.util.*;</pre>
	New	Ctrl+N	/** Model exported on May 12 2011, 16:17 by COMSOL 4.1.0.185. */
D	Open	Ctrl+O	public class StaticBar {
	Open Model Library		<pre>public static void main(String[] args) {</pre>
	Open Recovery File		run();
	Save	Ctrl+S	
	Save As		<pre>public static Model run() { Model model = ModelUtil.create("Model"); </pre>
	Save As Model Java-File		
	Save As Model M-File		<pre>model.modelPath("C:\\OptiY 2\\COMSOL Projkte\\StaticBar");</pre>
	Revert to Saved		model.param().set("Width", "1.036830E+001[mm]");
	Connector Server		model.param().set("High", "5.130229E+000[mm]"); model.param().set("Exp.th", "1.015408+002[mm]");
	Disconnect from Server		, modelparam().coor _ engon , itereteres(engl),
	Disconnect from server		<pre>model.modelNode().create("mod1");</pre>
	Export Model to Server		<pre>model.geom().create("geom1", 3);</pre>
	Import Model from Server		model mask() grante("mask1" "granm");
₿	Print	Ctrl+P	model.mean().cleate(meani , geoma),
	Save Model Image		<pre>model.physics().create("solid", "SolidMechanics", "geom1");</pre>
	Reset History		
	Clear Meshes		
	Clear Solutions		Check for important parts of the Java file (e.g. StaticBar.java)
	1 C:\OptiY 2\COMSOL Projkte\StaticBar\StaticBar.mph		required in OptiVu
	2 C:\OptiY 2\COMSOL Projkte\StaticBar\StaticBar_Model.mph		required in Opti 1.
	3 C:\OptiY 2\COMSOL Projkte\ThermalActuator\Actuator.mph		
	4 C:\COMSOL41\models\RF_Module\RF_and_Microwave_Engineering\patch_antenna.mph		
			Setting the model parameter
	EXIT		

Model.param().set("Width", "10[mm]")Check computing codes to avoid unnecessary multiple

computing

Save the table to a text file

model.result().table("tbl1").save("Results.txt");



OptiY Step 1: Build the Workflow

Watching the video "Design of Experiment" on http://www.optiy.eu/Demo.htm



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OptiY Step 2: Load the Java File to Input-File

Assign the OptiY input-variables to the COMSOL model parameters

Input File	
General Input File	
ASCII-File	Input-Variables
<pre>import com.comsol.model.*; import com.comsol.model.util.*; /** Model exported on May 12 2011, 16:17 by COMSOL 4.1.0.185. */ public class StaticBar { public static void main(String[] args) { run(); } public static Model run() { Model model = ModelUtil.create("Model"); model.modelPath("C:\\OptiY 2\\COMSOL Projkte\\StaticBar"); model.param().set("Width", "10[mm]"); model.param().set("Length", "5[mm]"); model.param().set("Length", "10[mm]"); model.modelNode().create("mod 1"); model.geom().create("geom1", 3);</pre>	Length High Width
model.mesh().create("mesh1", "geom1");	Start-Position 482
model.physics().create("solid", "SolidMechanics", "geom1");	Aktual Value
<pre>model.study().create("std1"); model.study("std1")feature().create("stat", "Stationary"); model.geom("geom1")feature().create("blk1", "Block"); model.geom("geom1")feature("blk1").setIndex("size", "Width", 0);</pre>	100 Format 0.000000E+000
ОК	Abbrechen Obernehmen Hilfe

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OptiY Step 3: Load the Text File to Output-File

Assign the OptiY output-variables to the COMSOL results

Output File		
General Output File		
ASCII-File	Output-Variables	
% Model: % Version: COMSOL 4.1.0.185 % Date: May 13 2011, 09:59 % Table: Table 1 - Global Evaluation 1 (MaxDisp) % MaxDisp (m) MaxMises (N/m ²) 0.004096222910633273 2.06215840477051E8	MaxDisp MaxMises	
	Key-String MaxDisp (m) Value-Accumulation Last Value	1. Actual Value 0.00443947
ОК	Abbrechen Obern	ehmen Hilfe

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OptiY Step 4: Setting Extern Script

Extern Script General Script Editor Network	• Ja reg
"C:\COMSOL41\bin\win64\comsolcompile.exe" jdkroot "C:\Program Files\Java\jdk1.6.0_25" StaticBar.java "C:\COMSOL41\bin\win64\comsolbatch.exe" inputfile StaticBar.class	fror on t
	• R(" <mark>C:</mark> '
	• Us the Cla
	• St (Sta con
OK Abbrechen Übernehmen Hilfe	

• Java Development Kit (JDK) is required additionally. Free download from <u>www.oracle.com</u> and install it on the computer

Root path of JDK:
 "C:\Prgram Files\Java\jdk1.6.0_25"

• Use comsolcompile.exe to compile the Java File (StaticBar.java) to Class File (StaticBar.class)

 Start computing the model (StaticBar.class) in batch mode using comsolbatch.exe