

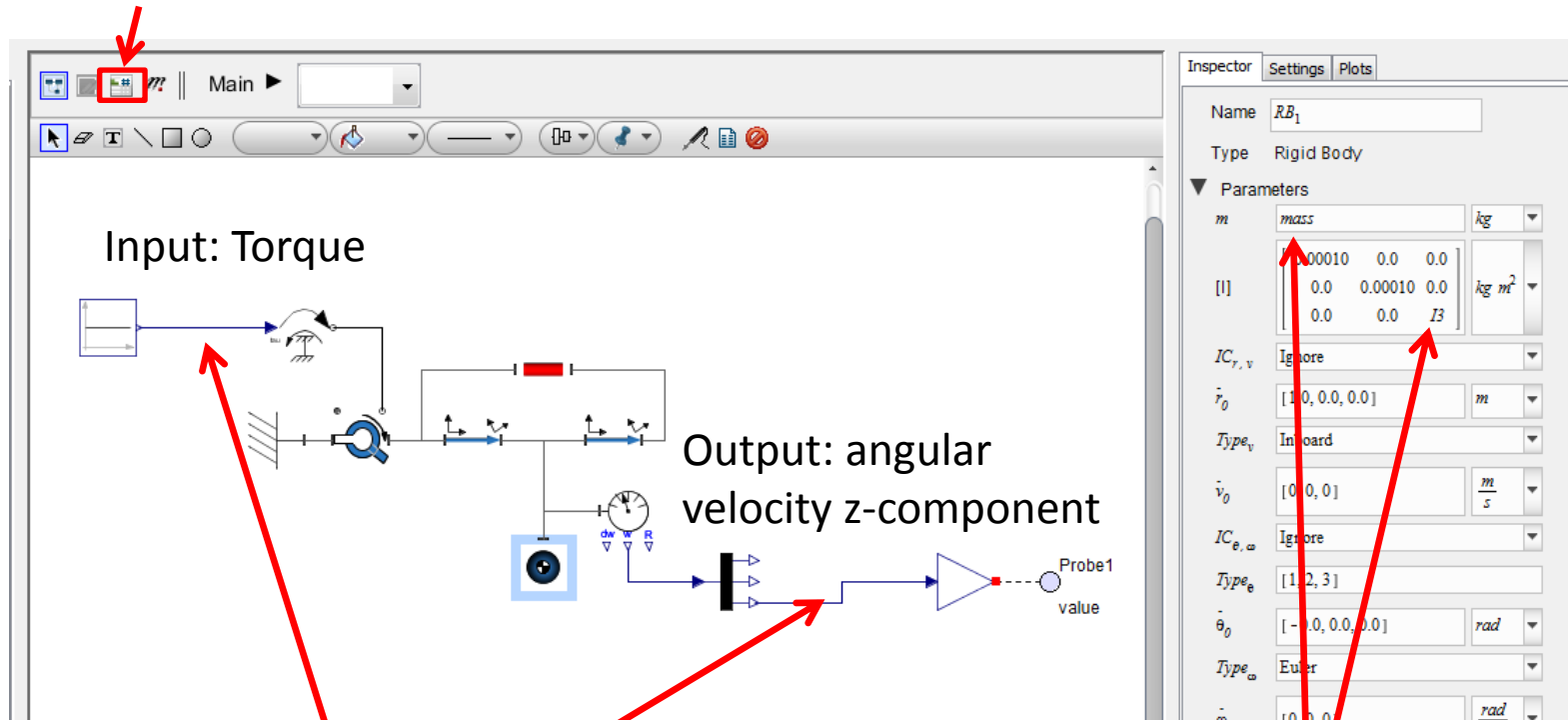
How to export MapleSim models to Simulink

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March 28, 2013

1) Prepare MapleSim model

Variables are declared in here
(see next slide)



I/O are selected and properly "arranged"

Parameters of interest are declared as variables

1a) declare variables

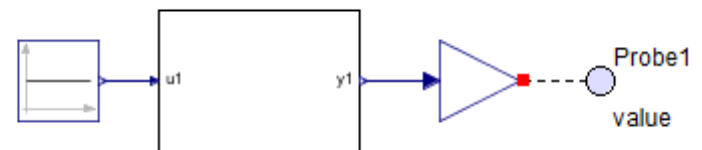
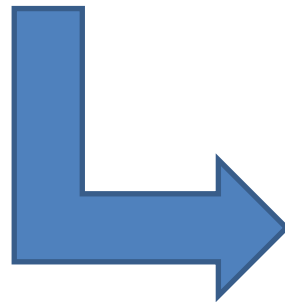
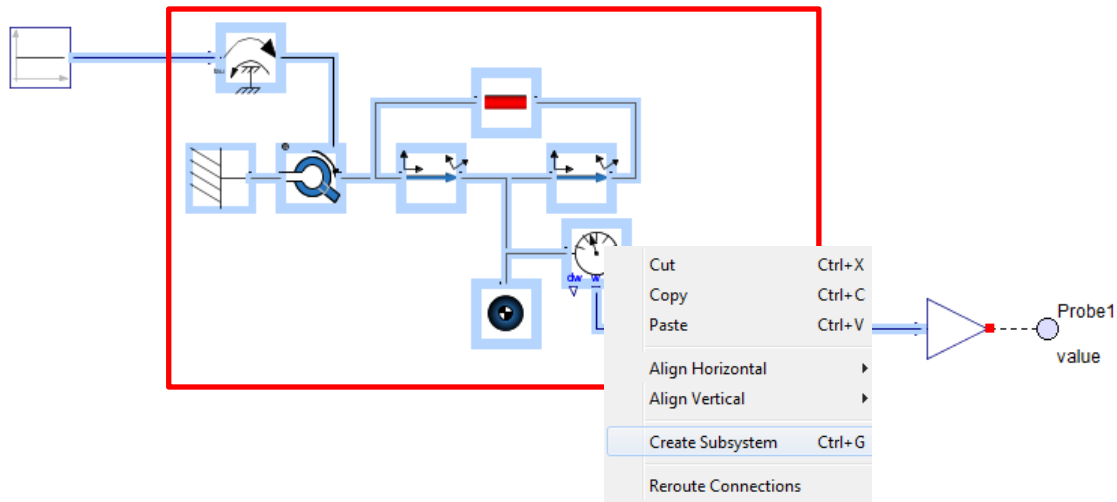
The screenshot shows the MapleSim 6 software interface. The main window displays the 'Main subsystem default settings' table, which is highlighted with a red box. This table lists variables to be declared for the simulation.

Name	Type	Default Value	Default Units	Description
mass	Real	1		
I3	Real	1		

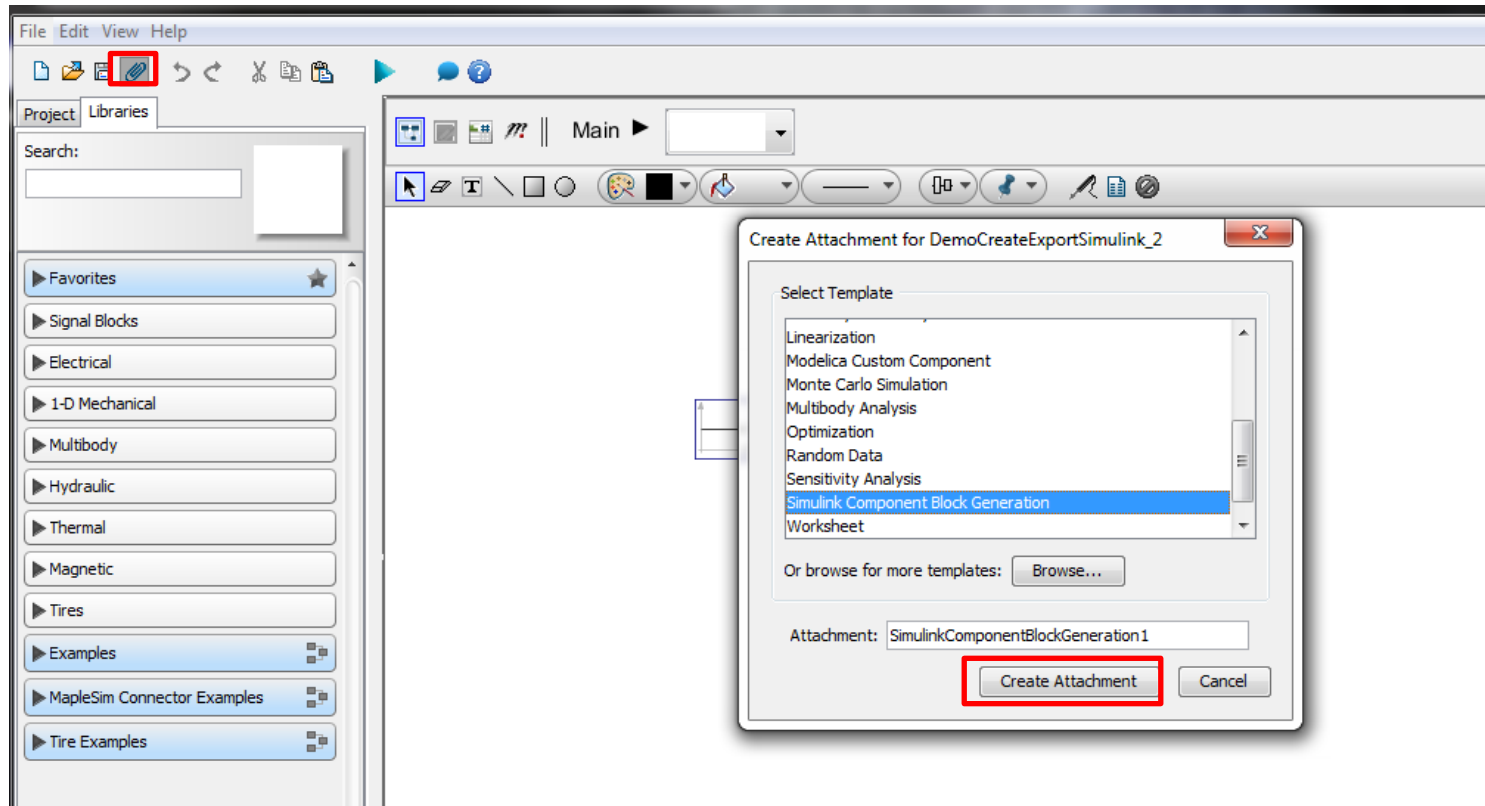
Below the 'Main subsystem default settings' table, the 'Subsystem Composition' section is visible, showing the 'FF₁ component' table.

Name	Type	Value	Units	Description
\vec{r}_{XYZ}	Position	[0, 0, 0]	m	The x,y,z offset of the outboard (hollow) frame with respect to ground
T_{pR}	Rotation Matrix Type	Euler Angles		Indicates whether \hat{R} (rotation matrix) or S-(θ), ζ , η , ξ (rotation sequence) will be used to express the outboard frame's orientation with respect to ground
[R]	Real	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$		Rotation matrix transforming a vector expressed in the local frame to the inertial frame
T_{pe}	Real	[1, 2, 3]		Indicates the sequence of subsequent rotations describing the orientation of the outboard frame with respect to ground. For example, [1, 2, 3] refers to sequential rotations about the x, then y, then z axis (123 - Euler angles)

2) Create subsystem



3) Export to Simulink



3) Export to Simulink

Description

Use this template to generate MATLAB® C S-Function code and a .m block script that can be compiled in MATLAB, and then automate the process of generating the code. For more information on how to set up Maple™ to communicate with MATLAB, see the [Configuring a Computer for MATLAB](#) help topic. For more information on the MapleSimConnector, see the [MapleSimConnector](#) help topic.

Note: Code generation now handles all systems modeled in MapleSim, including hybrid systems with defined signal input (RealInput).

S-Function Block Generation

Step 1: Subsystem Selection

The screenshot displays the MapleSim software interface. On the left, a tree view under the 'Main' tab lists three subsystems: 'G_1', 'const_1', and 'sub1_1'. The 'sub1_1' subsystem is highlighted in blue. A red arrow points from the text 'Select appropriate subsystem' to this highlighted item. The main workspace shows a block diagram with an input block 'u1' connected to a block 'y1', which is then connected to a gain block. The output of the gain block is connected to a 'Probe1' block, which displays the 'value'. At the bottom of the interface, a button labeled 'Load Selected Subsystem' is highlighted with a red box.

Select appropriate subsystem

3) Export to Simulink

Step 2: Inputs/Outputs and Parameter Management

Input Ports:

	Input Variables	Port Grouping Name	Change Row
1	`Main.sub1_1.u1`(t)	"inputs"	

Group all inputs into a single vector Add additional inputs for required input variable derivatives

Output Ports:

	Output Variables	Port Grouping Name	Change Row
1	`Main.sub1_1.y1[1]`(t)	"outputs"	

Group all outputs into a single vector Add an additional output port for subsystem state variables

Parameters:

Toggle Export Column

	Parameters	Value	Export	Updated Row
1	I3	1.	"X"	
2	mass	1.	"X"	

Group all parameters into a single vector Generate m-script for assigning parameters



Type anything in these cells
to select the parameter

3) Export to Simulink

Step 4: Generate C Code

Target directory:

C:\Users\Andrew

Browse

Block Name:

sub1_1

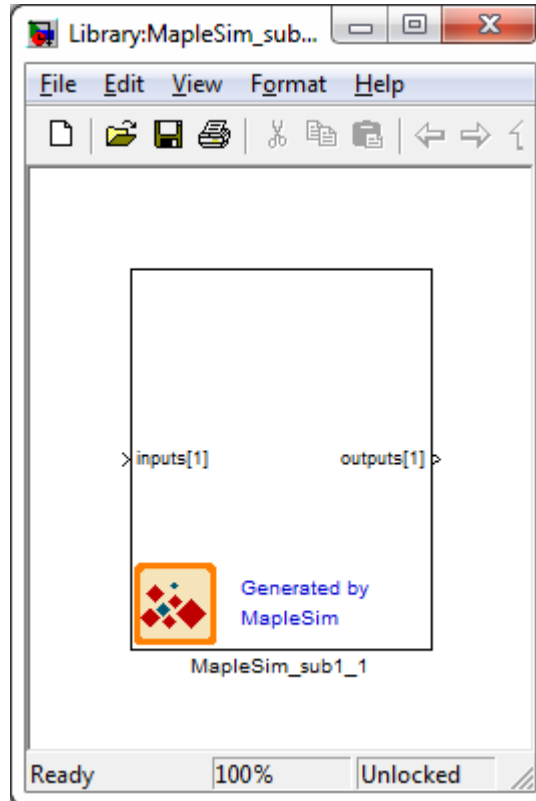
Generate S-Function Code (no Compile)

Generate and Compile S-Function

4) Compile in Matlab

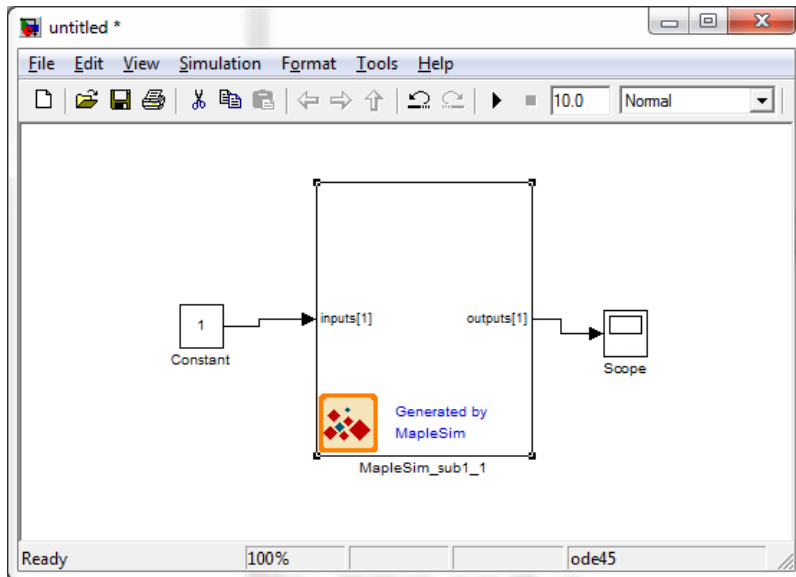


Run this file



Note: in order to carry out this step you need to have a C++ compiler installed. If you don't have one you can download Microsoft's VC++ compiler for free!

5) Finished!



Function Block Parameters: MapleSim_sub1_1

sub1_1 (mask) (link)

Variable Definition

Variable(s) for Initial Condition Vector:

$x[0] = \text{'Main.sub1_1.R1.theta'}`(t)$
 $x[1] = \text{diff('Main.sub1_1.R1.theta'}`(t),t)$

Variable(s) in output vector:

$y[0] = \text{'Main.sub1_1.y1[1]}`(t)$

Variable(s) in input vector:

$u[0] = \text{'Main.sub1_1.u1'}`(t)$

Variable(s) in the parameter vector:

$p[0] = \text{'Main.I3'}` (default = 1.)$
 $p[1] = \text{'Main.mass'}` (default = 1.)$

Parameters

Initial Conditions:

[0., 0.]

Parameters:

[1., 1.]

OK Cancel Help Apply