

#### Simulation Modeling Sciences

## CUBIT Fast-Start Tutorial 25. Usability Tools (Advanced)



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# **Custom Toolbars**



**CUBIT Basic Tutorial** 



### **Custom Toolbars**

- Convenient access to frequent tasks as toolbar buttons
  - Run favorite Cubit commands
  - Play specific scripts
  - Shortcuts to specific command panels
- Share with colleagues
  - Import and export toolbars and supporting files.





### **Custom Toolbars**







### **New Toolbar**

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۰ 🕼	New Toolbar ? 😒 🔿 😣
Name:	
File:	
	OK Cancel

3 Give the toolbar a name and a filename. Click *OK*.



Click the '+' button in the Buttons column.

	Custom Toolbar Editor	$\otimes \odot \odot$
Toolbars	Buttons	
	sible  All Visible	
Edit Tool Name:	bar MyTools	
File:	/home/michael/CurrentTask/MyTools.ttb	€3
Descrip	btion	
(Optio	Reset OK Apply	Cancel
		Sandia Nationa



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### **New Tool Button**

	Tool Button
)	Copy Existing
3	Actions (5)

Accept the default Tool Button type 5 and click OK.

Give the tool button a name.

6

Enter Cubit commands here (e.g., 'brick x 10', 'mesh volume 1', etc.)

Click OK to save the toolbar. A new 8 toolbar should appear in the GUI.



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Toolbars	Buttons	
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Name New Custom		
lcon		
Working Dir (Optiona	6	
Commands		
Enter commands he	re.	
Show Description		
Help Res	et OK Appl	y Cancel
	8	Sandia

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### **Custom Toolbar Button Types**

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1	Tool Button
	Journal File
٠	Python Script
	Command Panel

- **Tool Button** execute a series of Cubit or Python commands.
- Journal File run a specified journal file
- Python Script run a specified Python script
- Command Panel open a specific command panel (acts as a shortcut)

() () () ()	Operation     Image: Construction       Image: Construction       Image: Construction
	Actions • MyTools • PythonExample • MyPythonScript • GeometryVolumeCreateBrick • MeshVolumeSchemeSweep • MyJournalFile
	OK Cancel

Copy Existing allows you to create a new tool by copying an existing one.



		Sim	ulation Modeling
	<b>@</b> 🖸	Custom Toolbar Editor	$\otimes \odot \odot$
	Toolbars	Buttons	
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file If unspecified			
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	Name MyCustomTo	bl	
	lcon		
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. Upon completion, the	mesh vol 1		
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mands to run. To run 🧹			
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innanus, uic mounic			

			Simula	tion Modeling S
	<b>@</b> 🖸	Custom Toolb	ar Editor	$\odot \odot \odot $
	Toolbars	Bu	ittons	
	✔ All Visible	+ - •	All Visible	+ -
	✓ MyTools		🖌 🐔 MyCustomToo	
con file. If unspecified, the default icon m nal file to run.	Edit Journal File Name MyJournalFile Icon Journal File /home/ Working Dir (Option Description (Optional)	michael/CurrentTask/m al)	iakebrick.jou	
ory before executing the journal seful if the journal file has re file paths for imports or ts. Restores the original working ory upon completion.	Help Re	set	OK Apply	Cancel

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## **Python Script Tool**

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 $\odot \odot \odot \otimes$ Custom Toolbar Editor Toolbars Buttons All Visible ✔ All Visible + -+ -✓ MyTools 🖌 🚳 MyCustomTool 🔽 🍈 MyJournalFile 🔽 🍦 MyPythonScript Tool icon file. If unspecified, Edit Python Script uses the default icon 🟓 Name MyPythonScript Icon ... Browse •3 /home/michael/CurrentTask/SomeCoolScript.py Script Python script to run. Files Working Dir (Optional) Description (Optional) Working Dir – changes the working directory before executing the Python script. Useful if the script uses relative paths or imports other Python scripts. Restores the original working directory upon completion. Help Reset ΟK Apply Cancel Sandia

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### **Command Panel Shortcut**

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A	ction -	Mesh					_
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		1+ 100		Ø	9	<b>-</b> 10 -00	
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Sou	rce Sur	face ID	(e)	E	Edit Too	olbars	
300	rce Sui						
Targ	get Sur	face ID					

Can create by right clicking on a blank area of the desired command panel. The panel's icon is used as the tool's default icon.

<b>@</b> 💿	Custom Toolbar Ed	litor ? 📀 🗞 🕺
Toolbars	Buttons	
✔ All Visible ✔ MyTools		<pre>/isible</pre>
Edit Command Panel		
Name MeshVolumeSchem	neSweep	
lcon		
Panel ID MeshVolumeSch	emeSweep	
Description		
(Optional)		
Command p	anel ID	Browse command
		panels
Help Reset	ОК	Apply Cancel



### **Toolbar Button Appearance**

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Buttons	
✔ All Visible	+ -
🗹 🚳 MyCustomTool	
V 🔮 V MeshVolum	eSchemeSwe
🔽 🏬 MeshVolumeSchem	neSweep

Drag buttons in the editor to re-order appearance on the toolbar.







### **Custom Toolbars**

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Features descriptive tooltips to help identify tools.

Right click for quick access to edit tools (opens editor)



![](_page_12_Picture_7.jpeg)

![](_page_13_Picture_0.jpeg)

### **Custom Toolbars Exercise**

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- 1. Create a new Tool button
- 2. Enter the commands:

*mesh volume all draw volume with not is\_meshed* 

- 3. Save the toolbar button.
- 4. Import the model "schemes.sat"
- 5. Click the new tool button to run the commands

![](_page_13_Picture_9.jpeg)

![](_page_14_Picture_0.jpeg)

### **Export Toolbar**

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![](_page_14_Picture_3.jpeg)

Right-click in the toolbars column of the editor. Select *Export*.

![](_page_14_Picture_5.jpeg)

1

Choose where to save the exported toolbar.

Click Next.

🍈 🖸	Export Toolbars	$\odot \odot \odot \otimes$
<b>Create ex</b> Choose t	<b>port file</b> the name of the exported file and the location where it wil	l be saved.
Save As:	/home/michael/CurrentTask/MyToolbar.tar.gz	€3
<u>H</u> elp	< <u>B</u> ack <u>N</u> ext >	Cancel

![](_page_14_Picture_9.jpeg)

![](_page_15_Picture_0.jpeg)

Select the toolbars to

4

5

export.

Click Next.

### **Export Toolbar**

✓ Select All ✓ MyTools		
<u>(4)</u>		
		÷.

![](_page_16_Figure_0.jpeg)

6

### **Export Toolbar**

![](_page_16_Figure_2.jpeg)

![](_page_16_Picture_4.jpeg)

![](_page_17_Picture_0.jpeg)

### **Import Toolbar**

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![](_page_17_Picture_3.jpeg)

Right-click in the toolbars column of the editor. Select *Import*.

![](_page_17_Picture_5.jpeg)

Choose a toolbar package and a directory to unpack it.

### Click Import.

![](_page_17_Picture_8.jpeg)

### **Import Toolbar**

![](_page_18_Picture_1.jpeg)

Review the Import Summary and click *Finish*.

			Simulation Mode	ling Sciences
	Impor	t Toolbars	S 🛇 S	
Import Summ	nary			
Reminder: Update fi	le and directory pa	ths in scripts and con	nmands.	
Imported Toolbars	5			
Name 🔺 File				
MyTools /home	e/michael/CurrentT	ask/tutorials/Toolbard	lir/toolbars/MyTool	
Extracted Files				
Filename	▲ Size	Location		
🛃 SomeCoolScr 🐵 MvTools.ttb	ript.py 0.002 KB 2.137 KB	/home/michael/Curr /home/michael/Curr	entTask/tutorials/T entTask/tutorials/T	
📄 makebrick.jou	u 0.002 KB	/home/michael/Curr	entTask/tutorials/T	
Hala			Finish	
			<u></u>	$\mathbf{\zeta}$
			4	

![](_page_18_Picture_5.jpeg)

![](_page_19_Picture_0.jpeg)

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# **Extended Selection**

![](_page_19_Picture_3.jpeg)

**CUBIT Basic Tutorial** 

![](_page_20_Picture_0.jpeg)

- Gives users the ability to use more complex selection tools.
- Can create new selection filters using Python
  - Start with a larger selection and narrow it down based on some user-defined criteria

![](_page_20_Picture_6.jpeg)

![](_page_21_Picture_0.jpeg)

### **Pick Extended**

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	<u>F</u> ile	<u>E</u> dit	⊻iew	<u>D</u> isplay	<u>T</u> ools	<u>H</u> elp		
		New					Ctrl+N	
2	$\square$	<u>O</u> pen					Ctrl+C	, ľ
	2	<u>S</u> ave					Ctrl+S	
		Save <u>A</u> s	s					
		<u>R</u> ecent	Impor	ts				•
	${}^{\swarrow}$	Import.	. –	7				
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		<u>1</u> //fas		MeshSc	alingAss	embly.cub		
		E <u>×</u> it						
1								

### Import 'knuckle.sat'

	$\frown$	
ſ	0	
	Ζ	
<u> </u>	-	/

Select the volume, right-click and choose *Pick Extended...* from the context menu. The Extended Selection Dialog will appear.

Select Other
Pick Extended
Rotate About
Draw Z
Draw Elements F
Isolate
Add to Group/BC
Add to Bicked Croup
Remove from Bicked Group
Visibility Off
Mesh
Delete Mesh
Show Quality
Beset Entity
List Information
Graphics View Hotkeys
Save Selection As
Delete

![](_page_21_Picture_8.jpeg)

### **Extended Selection Dialog**

![](_page_22_Figure_2.jpeg)

![](_page_22_Picture_4.jpeg)

### **Load Filter Dialog**

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	🍈 🕙 🛛 Locate and Load Filters 🕜 📀 ⊗ ⊗
Directory containing filter scripts. Note: default scripts are provided in <install_dir>/scripts/SelectionFilters</install_dir>	<ul> <li>ndia/Cubit-release-qt5/claro/scripts/SelectionFilters</li> <li>Browse</li> <li>Select/Unselect all</li> <li>AdjacentVolumeFilter.py</li> </ul>
List of enabled filters.	<ul> <li>CoordinateFilter.py</li> <li>CurveFilter.py</li> <li>RadiusFilter.py</li> <li>SurfaceAreaFilter.py</li> <li>SurfaceFilter.py</li> <li>VertexFilter.py</li> </ul>
Script viewer – provides a read-only view of the script's contents.	<ul> <li>VolumeFilter.py</li> <li>VolumeFilter.py</li> <li>For example, # if vertex 1 is attached to surfaces 1, 2, and 3, selecting vertex 1 will # populate the target selection list with surface 1, 2, and 3.</li> <li>import cubitgui import cubitgui</li> </ul>
4 Select all filters.	class SurfaceFilter(cubitgui.SelectionFilter):
5 Click <i>OK</i> to save and close the dialog.	Clear List
	CUBIT Basic Tutorial

![](_page_24_Picture_0.jpeg)

### **Run Filter**

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Pick Curves			
	d Filters Pick Cu	rves 💌	Load Filters
Surface Are 6 ect Pick Surfaces	ntities Sour Volume	ce Selection Targe Curve 1 Curve 10 Curve 11 Cur	t Entities
Pick Vertices Pick Volumes	:	Curve 12 Curve 13 Curve 14 Curve 15	
		Curve 16 Curve 17 Curve 18 Curve 19	8
		Curve 2 Curve 20 Curve 21 Curve 22	
Refresh Close	e	Refresh C	lose

![](_page_24_Picture_4.jpeg)

Change the filter to Pick Curves

Select the volume in the Source Selection column

8 Select several curves in the Target Entities column

![](_page_24_Picture_8.jpeg)

### **Drag Target Selections**

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$rac{1}{40}$ $\odot$ Extended Selection $\bigcirc$ $\oslash$ $\bigotimes$	🍈 🕑 Extended Selection 🧷 😒 🛆 😣
Pick Curves    Load Filters	Pick Surfaces   Load Filters
Source Selection Target Entities	Source Sele Target Entities
Volume 1 Curve 10 Curve 11 Curve 12 Curve 15 Curve 16 Curve 14 Curve 16 Curve 14	Volume 1 curve 14 curve 15 curve 16 curve 17 curve 18
Curve 17 Curve 18 9 Curve 16 Curve 17 Curve 18 Curve 19	
Curve 2 Curve 20 Curve 21 Curve 22 Curve 23	
Refresh Close	Refresh Close

9 Drag the curves into the Source Selection column

10 Change the filter to *Pick Surfaces* 

![](_page_25_Picture_5.jpeg)

![](_page_26_Picture_0.jpeg)

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![](_page_26_Figure_2.jpeg)

1) Select a curve (or two) to update the Target Entities column with surfaces.

![](_page_26_Picture_4.jpeg)

Select a surface in Target Entities column and note the updated selection in the graphics view.

![](_page_27_Picture_0.jpeg)

### **Context Menu Options**

![](_page_27_Figure_3.jpeg)

![](_page_27_Picture_4.jpeg)

**Filter Script** 

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![](_page_28_Figure_2.jpeg)

Source selection type and IDs retrieved using get\_source\_types() and get\_source\_ids().

Target selections added using
add\_target\_selection(type, id)

![](_page_28_Picture_5.jpeg)

### **Filter Script Exercise**

![](_page_29_Figure_1.jpeg)

Copy the file **SurfaceFilter.py** and rename it to **UnmergedSurfaceFilter.py**.

![](_page_29_Picture_3.jpeg)

![](_page_29_Picture_4.jpeg)

![](_page_29_Picture_5.jpeg)

Add a check for the merge status of a surface and save the filter. *Remember indentation is important in Python.* 

![](_page_29_Picture_7.jpeg)

![](_page_30_Picture_0.jpeg)

### **Filter Script Exercise**

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In Cubit, run the commands: reset brick x 10 volume 1 copy move x 10 merge all

G 6 an

Select a volume, right-click and open the Pick Extended dialog. Click *Load Filters*.

![](_page_30_Figure_6.jpeg)

![](_page_30_Picture_7.jpeg)

### **Filter Script Exercise**

🍿 😳 🛛 Locate and Load Filters 🕐 😒 🔿 🗵	
-release-qt5/claro/scripts/SelectionFilters Browse	•
Select/Unselect all	A
✓ AdjacentVolumeFilter.py	s
CurveFilter.py	Р
✓ SurfaceAreaFilter.py	R
UnmergedSurfaceFilter.py	s
neFilter.py	Р
(7)	U
	Р
	P
Clear List	
OK Cancel	

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![](_page_31_Picture_3.jpeg)

![](_page_31_Picture_4.jpeg)

Select the new UnmergedSurfaceFilter. Click *OK*.

Select the new filter and run it on

8 Volume 1. The resulting target list

should have 5 surfaces.

![](_page_31_Picture_9.jpeg)

![](_page_32_Figure_0.jpeg)

## **Filter UI**

- Filters can add very basic UI.
- Uses a Qt .ui file. These can be generated using Qt Designer. See <u>http://doc.qt.io/qt-5/qtdesigner-</u> manual.html
- In the Python filter script, the desired .ui file is specified by implementing the function get\_ui\_file().
- UI elements are referenced by their objectName, as specified in the .ui file.
- For an example of how this is done, please refer to the included filter RadiusFilter.py.

Extended Se	lection 🕐 🖂 🖄
Radial Select	<ul> <li>Load Filters</li> </ul>
Radius: Select: Volumes	
Source Selection	Target Entities
Volume 1	
Refresh	Close

![](_page_32_Picture_9.jpeg)