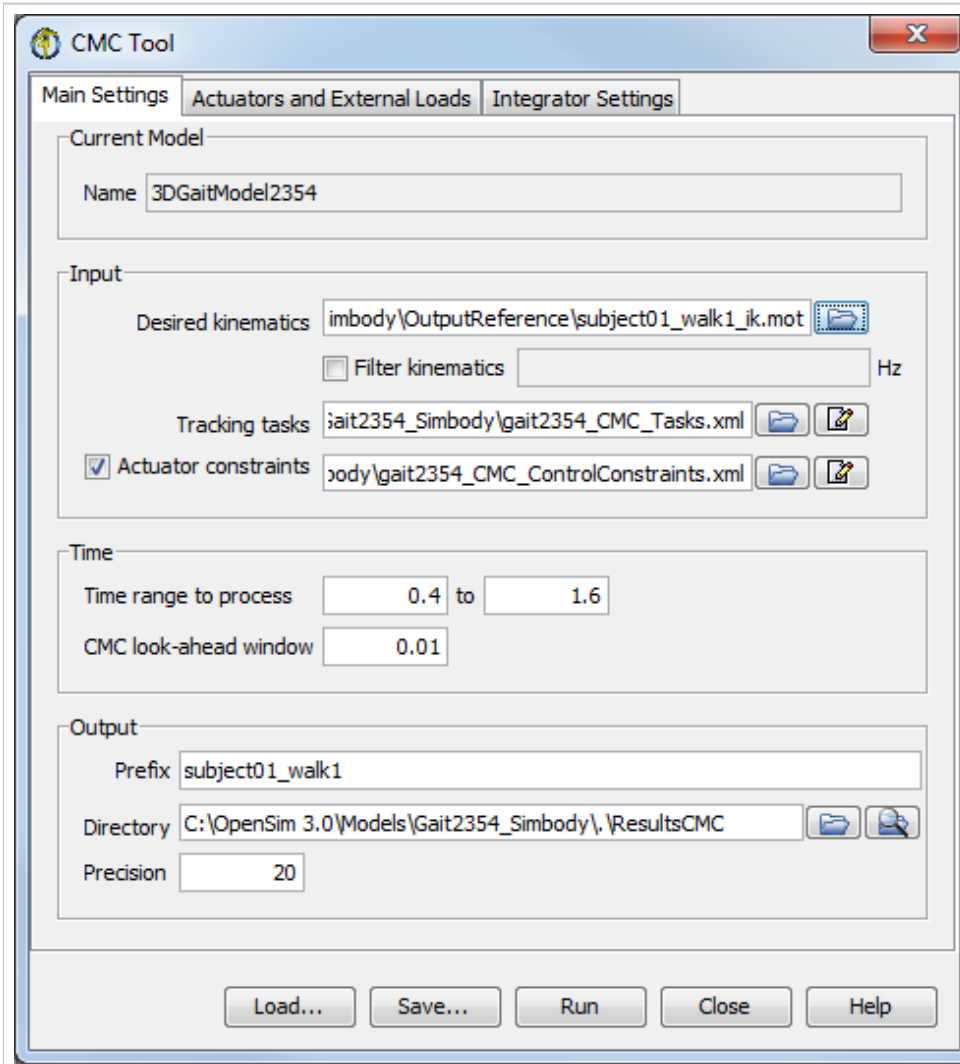


How to Use the CMC Tool

How to Use the GUI

The computed muscle control tool is accessed by selecting **Tools Computed Muscle Control...** from the OpenSim main menu bar (figure below). Like all tools, the operations performed by the computed muscle control tool apply to the current model. The name of the current model is shown in bold in the Navigator. See chapters [Opening, Closing, and Using the Navigator Window](#) for information on opening models and making a particular model current.

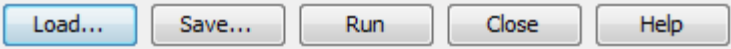
The Computed Muscle Control (CMC) Tool is controlled by a window with three tabbed panes (figure below). This window is the same as that used for RRA (see [Residual Reduction Algorithm](#)).




- The *Main Settings* pane is used to specify parameters related to the input kinematics of the current model, the time range for the analysis, and the output of the results.
- The *Actuators and External Loads* pane is used to specify additional actuators, such as residual and reserve actuators.
- The external loads and integrator settings are specified in the same manner as in [Forward Dynamics](#).

The Control Panel

At the bottom of all the Tool dialog windows are four buttons, located in what we call the *Control Panel*.



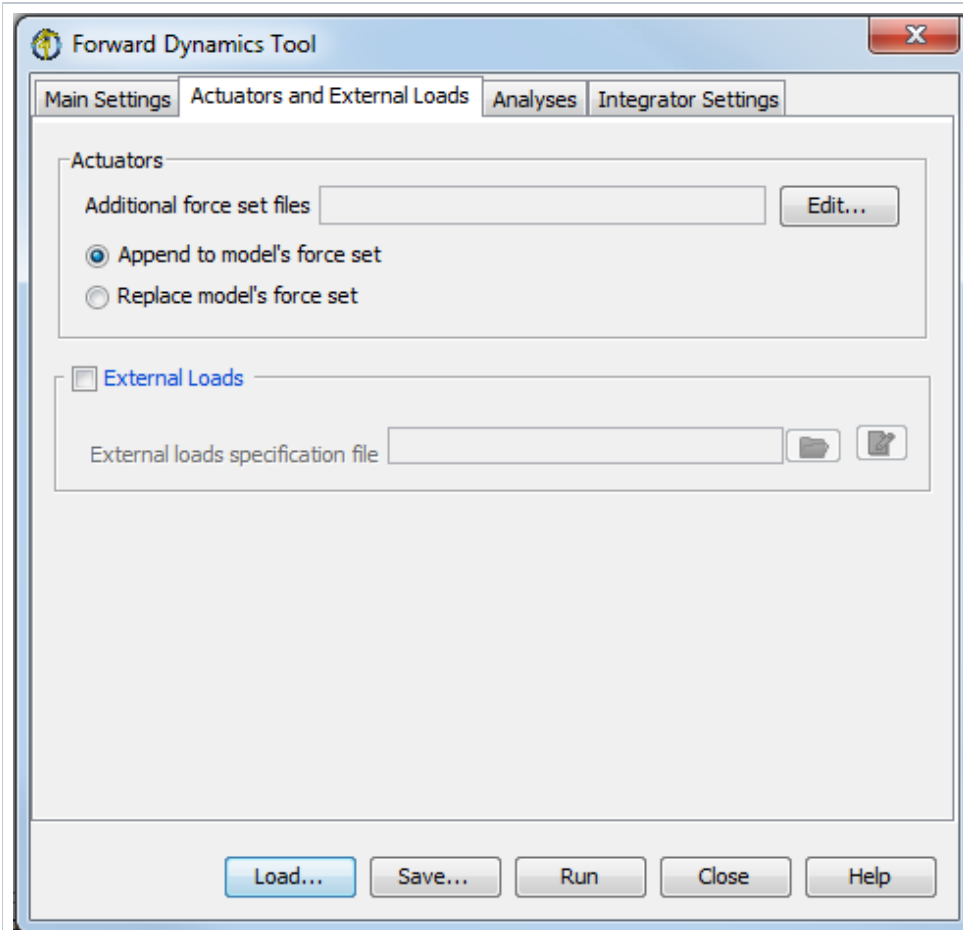
- The **Load** and **Save** buttons are used to load or save settings for the tool.
- The **Run** button starts execution.
- The **Close** button closes the window.
- The **Help** button takes you to the relevant section of the User Guide.

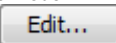
 Note that the **Close** button can be clicked immediately after execution has begun; the execution will complete even though the window has been closed.

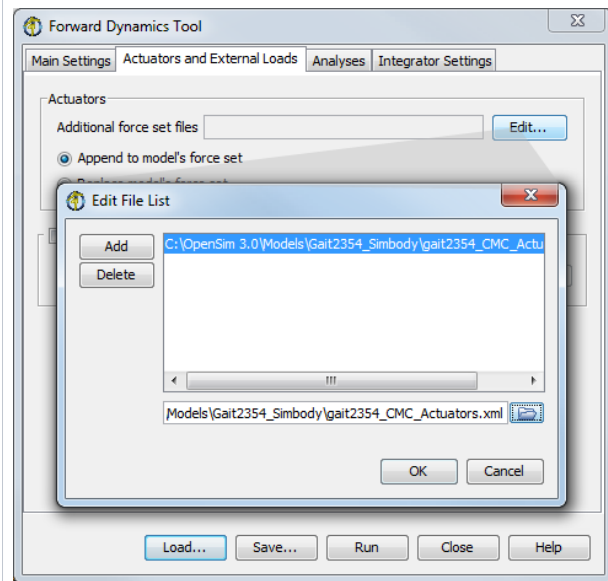
- If you click **Load...**, you will be presented with a file browser that displays all files ending with the **.xml** suffix. You may browse for an appropriate settings file (e.g., **subject01_Forward_Setup.xml** or **subject01_Scale_Setup.xml**) and click **Open**. The tool will then be populated with the settings in that setup file.
- If you have manually entered or modified settings, you may save those settings to a file for future use. If you click **Save...**, a Save dialog box will come up in which you can specify the name of the settings file. The name you specify for the file should have a suffix of **.xml**. Click **Save** to save the settings to file.
- After you click **Save**, you may be presented with another dialog box that asks you whether or not you would like to save some of the settings to separate external files. This can be useful if you would like to reuse those settings for other trials or subjects. Check the boxes of the settings that you'd like to save to external files and specify the names of these files. All of these files should have a suffix of **.xml**.

Actuators and External Loads Pane

The *Actuators and External Loads* pane is used to specify parameters relating to the actuators appended to the model and the external loads applied to the model during CMC. The pane is organized into two main sections entitled *Actuators* and *External Loads*.



- The section for *Actuators* displays editable information that allows you to specify additional force set files that specify forces to supplement the muscles of the model.
- You may use the  button to edit the list of force set files describing the forces to be appended to or replaced in the model.



- The information in the *External Loads* section is optional.
- If checked, the section displays information so that you can specify the external loads applied to the model.
- Please refer to the section on ExternalLoads specification under the [How to Use the Inverse Dynamics Tool](#) for more details.

Command-line Execution

CMC is run using the command `cmc -S <setup file>` where <setup file> is the name of the setup file, for example,

```
cmc -S subject01_Setup_CMC.xml
```

Next: [CMC Settings Files and XML Tag Definitions](#)

Previous: [How CMC Works](#)

Home: [Computed Muscle Control](#)