

OpenModelica GUI User Manual

Battula Sai Vinesh

July 3, 2017

Contents

1	GUI Application Overview	1
1.1	Overview	1
1.2	Features	1
1.3	Compatibility	2
1.4	Contribution	2
1.5	Development History	2
2	GUI Installation	3
2.1	Windows Platform	3
2.2	MacOS Platform	3
3	Understading The Interface	4
3.1	Elements	5
4	Menu Bar	6
4.1	Standard Menus	6
4.1.1	[Flie] Menu (Saving/Restoring your Parameters)	6
4.1.2	[Edit] (Unused)	6
4.1.3	[Insert] (Unused)	6

4.2	[Tools] Menu (Unused)	6
4.3	[Utilities] Menu	7
4.4	[Optimization] Menu (Unused)	7
4.5	[Scripts] Menu (Unused)	7
4.6	[Results] Tools Menu (Unused)	7
4.7	[Plugins] Menu (Unused)	7
4.8	[Windows] Menu	7
4.9	[View] Menu (Unused)	7
4.10	[Help] Menu (Unused)	7
5	Tool Bar	8
5.1	Compounds	8
5.2	Thermodynamics	9
5.3	Compilation and Simulation	9
6	Canvas	11
6.1	Flowsheet	11
6.2	Unit Operations Shelf	11
7	Unit Operations	13
7.1	Material Steam	13
7.1.1	Connections	13
7.1.2	Properties	13
7.2	Mixer	14
7.2.1	Connections	14
7.2.2	Properties	14
7.3	Flash	14

7.3.1	Connections	14
7.3.2	Properties	15
8	Binary Envelope Plotter	16

Warranty

The OpenModelica Graphical User Interface is provided "as is" without warranty. The entire risk for the results and performance is assumed by the user.

Software License

The OpenModelica Graphical User Interface is an open-source software. This software can be freely used, modified and shared.

Chapter 1

GUI Application Overview

The document describes the OpenModelica Graphical User Interface application.

1.1 Overview

The GUI application described in this document is a Graphic User Interface for OpenModelica. OpenModelica is an open-source Modelica-based modelling and simulation environment intended for industrial and academic usage. This GUI gives an easy way for modelling and simulation of chemical processes.

1.2 Features

The GUI has a very basic user interface. It features several unit operations like material stream, flash and mixer. The GUI offers a binary envelope plotter for plotting The GUI has a built-in compound database for addition of compounds for a process. The GUI is basically built using kivy language and uses OMPython interface to communicate with OpenModelica simulator.

Standard file Save/Open operations provide the GUI to save current built process and reuse later.

1.3 Compatibility

PC Operating System The GUI has been tested to work on Windows and MacOS platforms.

1.4 Contribution

The application is open-source software. The source code is available online and open for any contributions.

1.5 Development History

Chapter 2

GUI Installation

2.1 Windows Platform

2.2 MacOS Platform

Chapter 3

Understanding The Interface

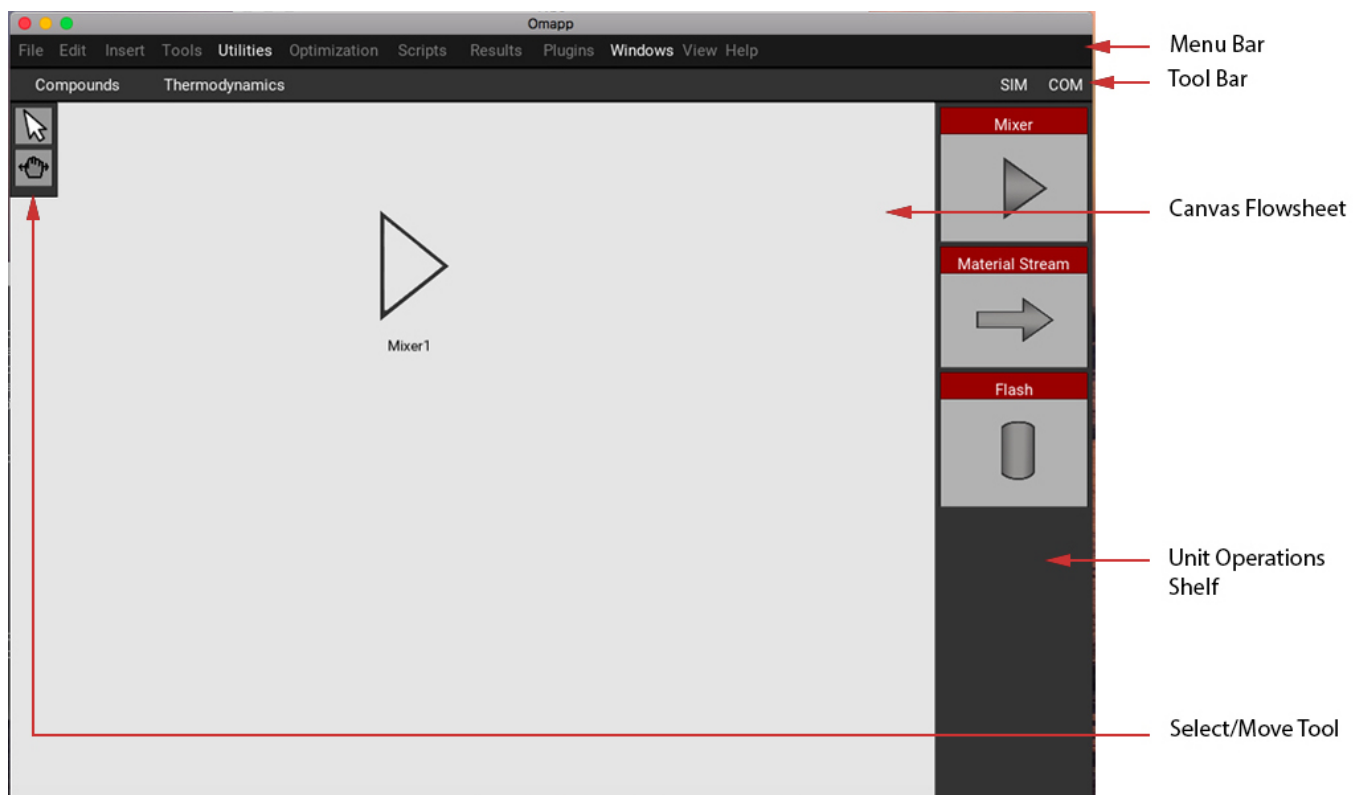


Figure 3.1: Basic Interface

3.1 Elements

As shown in figure 1 the GUI has 5 basic elements.

1. Menu Bar
2. Tool Bar
3. Canvas Flowsheet
4. Unit Operations Shelf
5. Select/Move Tool

The Menu bar provides several options.....

The Tool bar has COM and SIM buttons used to compile and simulate a chemical process. It also has compounds menu to select required compounds and a VLE model selector for selecting a thermodynamic model for current simulation.

Canvas Flowsheet is the area where all the designing of the chemical process is done. Unit Operations are dragged into it and connected to construct a chemical process.

Unit Operations Shelf contains all the Unit Operations used to build a chemical process. To include one just drag it into the flowsheet area.

The Select/Move Tool toggles between move and select option.

Move - To move the canvas

Select- To lock the canvas and select unit operations

Chapter 4

Menu Bar

4.1 Standard Menus

4.1.1 [File] Menu (Saving/Restoring your Parameters)

This menu provides the usual New, Open..., Save, Save As... options. In this application you use this menu and the associated Windows Open File Dialog to save and restore Steady State Simulation Settings to/from your hard drive. The files that you save and restore to/from your harddrive will all have the .og extension

4.1.2 [Edit] (Unused)

This menu is not used by the GUI so it is "greyed out"

4.1.3 [Insert] (Unused)

This menu is not used by the GUI so it is "greyed out"

4.2 [Tools] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.3 [Utilities] Menu

This menu is used to access the Binary envelope plotter utility.

4.4 [Optimization] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.5 [Scripts] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.6 [Results] Tools Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.7 [Plugins] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.8 [Windows] Menu

This menu has general window settings. It has an option to resize the canvas flowsheet area.

4.9 [View] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

4.10 [Help] Menu (Unused)

This menu is not used by the GUI so it is "greyed out"

Chapter 5

Tool Bar

The Tool Bar has three import parts -

1. Compounds Selection
2. Thermodynamic Model Selection
3. Compilation and Simulation



Figure 5.1: Tool Bar

5.1 Compounds

Clicking on the Compounds button opens a pop-up. Compounds required for the process simulation can be selected from the pop-up. If a compound name is typed suggested compounds are listed from which one can select their required compound. Selected

Compounds can also be removed by selecting the compound and pressing the remove button.

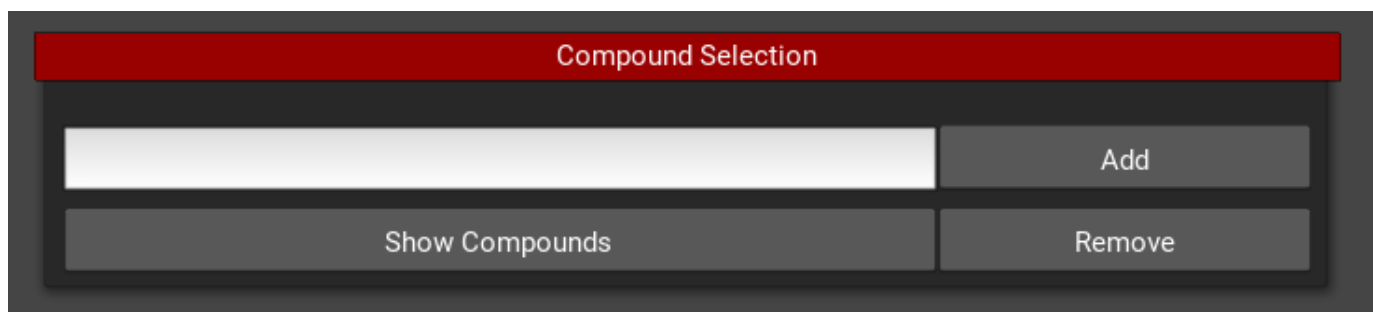


Figure 5.2: Compounds Pop-up

5.2 Thermodynamics

Clicking the thermodynamics button opens a pop-up. The thermodynamic model used for the current simulation can be selected from the pop-up.

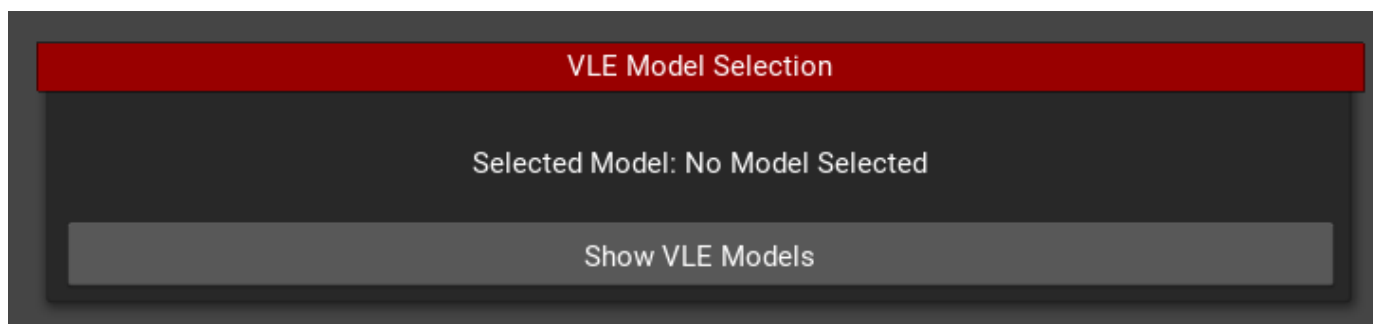


Figure 5.3: Thermodynamics Pop-up

5.3 Compilation and Simulation

To get the results for a process first compile **COM** and the simulate **SIM**. Clicking the SIM button opens a pop-up. The simulation settings pop-up is used to set settings for simulation and simulate. The simulation settings are by default set.

Simulation Settings

General

Output

Start Time:

Stop Time:

Select

Integration

Method

Tolerance

Jacobian

DASSL/IDA Options

☒
☐

Initial Step Size

Maximum Step Size

Maximum Integration Order

Compiler Flags (Optional)

No of Processors

Select

Select

Root Finding

Restart after Event

SIMULATE

Figure 5.4: Simulation Settings

Chapter 6

Canvas

6.1 Flowsheet

The canvas flowsheet area is the place where the chemical process for simulation is build. Unit operations used for simulation can be dragged from Unit Operations Shelf and directly dropped into the flowsheet area. Single or multiple Unit operations can be removed from the flowsheet by selecting and clicking right mouse button and clicking remove button.

6.2 Unit Operations Shelf

The Unit Operations Shelf has all the unit operations used to build a chemical process. Currently the GUI only supports three Unit Operations -

1. Mixer
2. Materail Stream
3. Flash

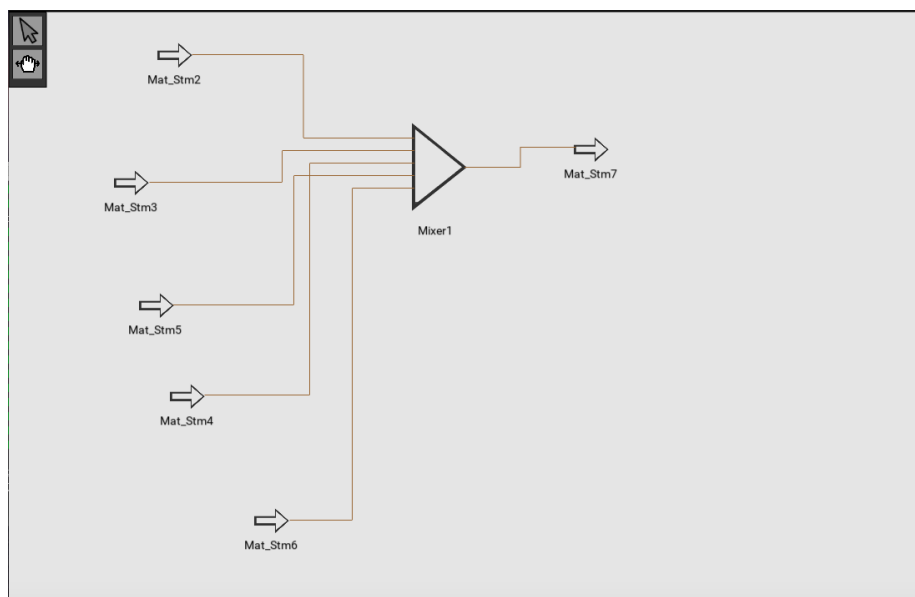


Figure 6.1: Flowsheet

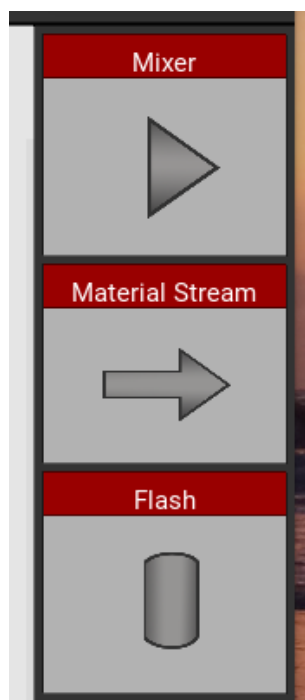


Figure 6.2: Unit Operations Shelf

Chapter 7

Unit Operations

7.1 Material Stream



Figure 7.1: Materail Stream

7.1.1 Connections

Material stream has **1 Input** and **1 Output** stream.

7.1.2 Properties

By double clicking on a material stream we can open its properties pop-up. Using this pop-up we can set the following properties -

1. **Name** - Name of the material stream.
2. **InputData** - Temperature, Pressure, Flow Rate, Mass Flow , Molar Flow, Volumetric Flow, Specific Enthalpy, Specific Entropy, Phase Mole Fraction.

3. **Compounds** - Proportion of compounds preset in the stream.
4. **Phase Properties**
5. **Annotations**

7.2 Mixer



Figure 7.2: Mixer

7.2.1 Connections

Mixer has **6 Input** streams and **1 Output** stream.

7.2.2 Properties

By double clicking on a mixer we can open its properties pop-up. Using this pop-up we can set the following properties -

1. **Name** - Name of the material stream.
2. **Connections** - This section has 6 inputs selection and 1 output selection. The input and output material streams can be selected from this section.
3. **Calculation Parameters**
4. **Property Package Settings**

7.3 Flash

7.3.1 Connections

Mixer has **2 Input** streams and **2 Output** stream.

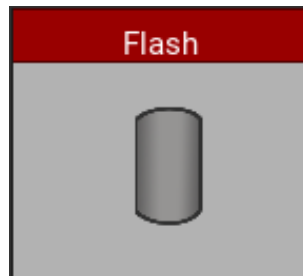


Figure 7.3: Flash

7.3.2 Properties

By double clicking on a Flash we can open its properties pop-up. Using this pop-up we can set the following properties -

1. **Name** - Name of the material stream.
2. **Connections** - This section has 2 inputs selection and 2 output selection. The input and output material streams can be selected from this section.
3. **Calculation Parameters**
4. **Property Package Settings**

Chapter 8

Binary Envelope Plotter

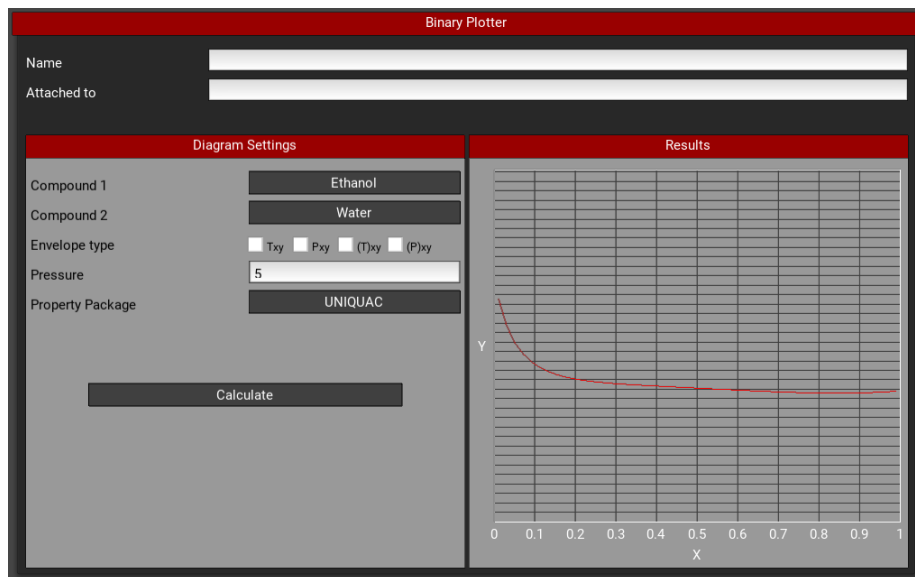


Figure 8.1: Basic Interface