

How to use SodaLab

Introduction

SodaLab works very similarly to Sodaconstructor, with a few bits missing and a few new features. The purpose of it is two fold, firstly to use as a teaching tool with some simple graphical enhancements. But also to show some of the ways in which the current soda constructor could be improved. We also hope to inspire debate about what you, the soda users would like added to the new versions of soda constructor.

Features

Here is a list of features which can be found in SodaLab but not in Soda Constructor:

- A grid that can aid the constructing of a soda model
- The colour and size of grid can be edited
- Snap to grid
- Ability to set individual springyness value for each muscle
- Ability to give masses different weights
- Ability to set individual gravity and friction values for each mass
- Reset button which resets to last loaded model
- The direction and strength of movement of masses (shown by a red line, for each mass)

Here is a list of features that can be found in Soda Constructor but not in SodaLab:

- Collision detection not fully implemented (i.e. so a soda model cannot walk)
- Effect of gravity not exactly the same as in soda constructor
- Cannot throw a mass
- Cannot connect to soda racer or saved models stored on username

What the buttons do

Below is information on how to perform actions on a soda model:

Simulate mode:

Left click – On a mass to select it, if you hold it down you can drag the model
On a spring to select it (the dot in the sine wave will highlight)

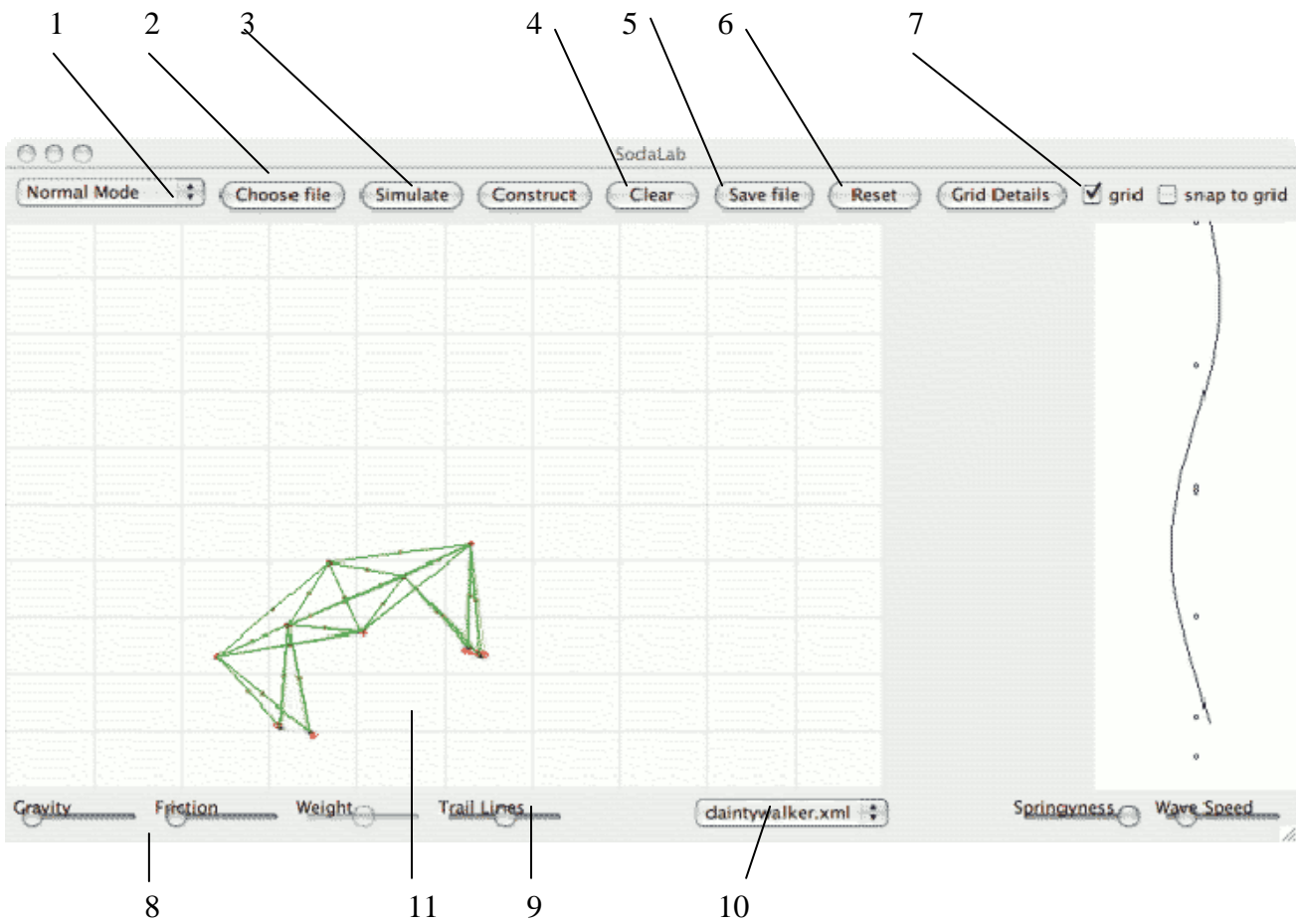
Construct mode:

Left click – To create a point
If no point is selected, click on it to select it

Left click with shift pressed – On a mass to delete it
On a spring to delete it
Anywhere else to deselect a point

The interface

Use the image and text descriptions below to understand how to use SodaLab



1. *Choosing the mode*

If you want to work as if in the normal soda constructor then select normal mode. Changing the values of gravity, springyness, friction etc. will have the same effect as in soda constructor. If you switch to alternative mode, then individual masses can have their own friction, gravity and weight set, while muscles can have their own springyness. It is important to note that when saving a file; if you are in alternative mode the xml file produced will not work in soda race or soda constructor. So to create a model in SodaLab and then use it in soda race/constructor you must be in normal mode, when you save.

2. *Choosing a file*

Simply select the xml file you wish to load into SodaLab. The model will then be loaded and displayed

3. *Simulate/Construct*

In simulate mode you can see how your model will react and edit values such as friction, gravity etc. In construct mode you can add masses, muscles and edit the structure of your model.

4. *Clear*

Clear will remove all masses and muscles.

5. *Save File*

A file can either be saved in normal mode or alternative mode. Normal mode produces a file that can be used with soda race and soda constructor (or SodaLab). Alternative mode produces a file that can only be used with SodaLab.

6. *Reset*

Will reset the masses, muscles and values to the last loaded model.

7. *The Grid*

The grid can be used to help when constructing a model. The snap to grid feature will create a mass at the point (corners of the grid squares) nearest to where you clicked. The colour and size of grid can be edited by clicking 'Grid Details'

8. *How to change values*

When in normal mode, everything works similarly to soda constructor, for example you can change the springyness by changing the position of the point in the slider bar. When in alternative mode, because a mass can have its friction, gravity and weight set individually you must first select a mass (by clicking on it) and then edit these values. This is the same for springyness, a muscle must first be selected then its value can be edited.

9. Trail Lines

The effect of trail lines can be edited using the slider in the diagram above. Trail lines can be turned off by moving the slider to the left or set to maximum by putting the slider to the right.

10. Pre-Loaded models

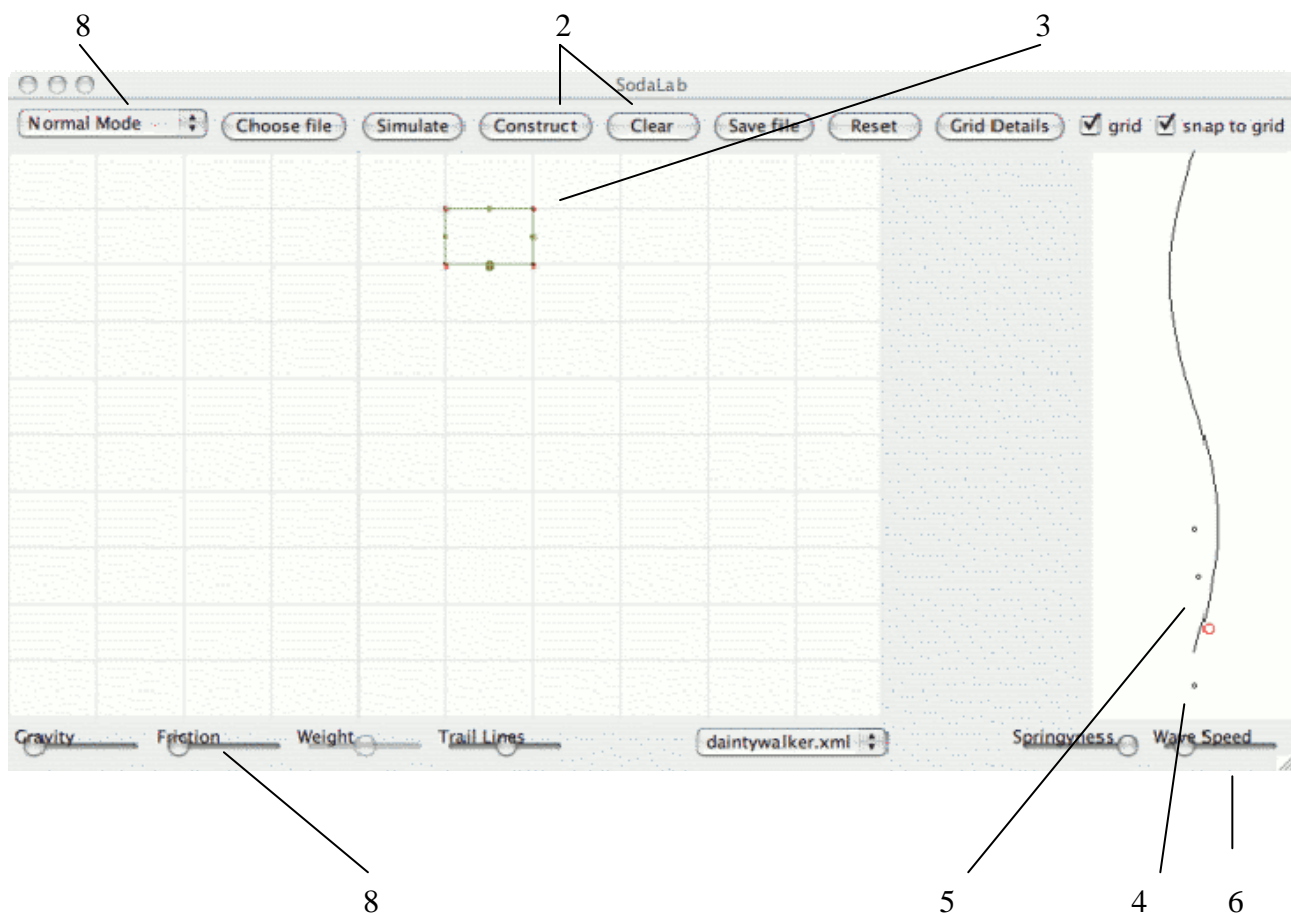
There are several pre-loaded models, which can be loaded, by selecting them from the drop down list.

11. Using SodaLab

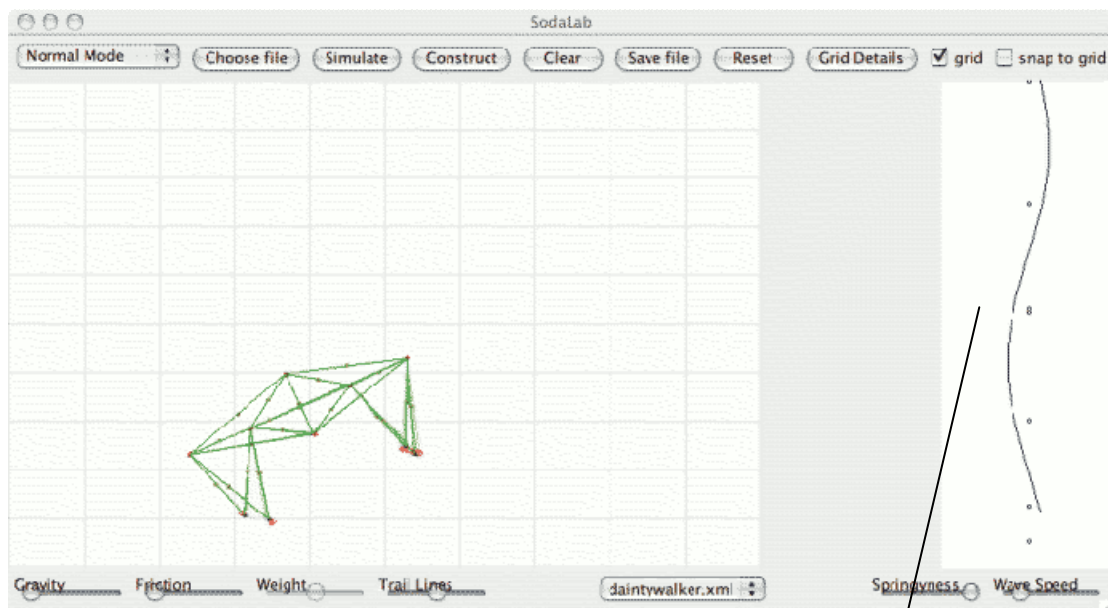
The model can be dragged around when in simulation mode by selecting a point and then moving in the direction you want to drag the model to. In construct mode doing this will only drag the individual point.

How to create a simple model

On the next page are some simple instructions on how to create a square that contracts and expands.



1. Start the SodaLab program.
2. Click the construct button and then the clear button. You now have a blank canvas to create a model.
3. Then click near four points that would create a model similar to a square shown above. As you click to create new points (known as masses), a line will be drawn between the points – these are springs (you can now change back to simulate mode).
4. To get a model to contract and expand, springs need to be converted to muscles; you will see a single dot (labelled 4 on the diagram above). You can move this by clicking on it and then dragging, as you move it, you should notice there are 4 dots in total these represent each spring. If you place these dots in the area where the wave is (labelled 5 on the diagram above) then the springs turn into muscles. Move all 4 points into the wav area.
5. Depending on where you moved the dots your shape will be contracting and expanding in different ways. There are 2 things to consider with positioning the dots on the wave, these are shown in the image below.



The 4 dots are all placed in the same line but at different points. They are at different points because this means they will contract and expand at different times (so if there are all at the same point they will contract and expand at the same time). If I moved 1 of the dots left and 1 to the right, then this would change how those muscles expand and contracted (the one on the right would expand further). What you can do now is experiment a little, what changes can you make, to get the square to expand and contract the most.

6. It is also possible to change attributes of the wave, you can change the wave speed, using the slider called wave speed and even by clicking on the wave and pulling to left or right to change the size of the wave curve. Both of these effects affect how big you can make your square expand to.
7. The other attributes you can edit are springiness, gravity and friction. The more friction you have the less your square will expand the greater springiness you have the more it will expand. Gravity will pull it downwards.
8. Those are the simple basics of SodaLab. But there is more, if you select alternative mode, (labelled 8 on the diagram). Then click on an individual mass, you will see the options in the bottom left usable. This time when you change anything (i.e. gravity), it will not be for the whole model, but just for that point. You can also change the weight of the mass; see what impact a lightweight mass has and what impact a heavyweight mass has.
9. Similarly by clicking on a spring in alternative mode you can, you set the individual springiness for that spring.