Platyswim

User Manual

The simulation should be started from a terminal window. This allows parameters of the model to be specified on the command line. _In mac OSX_, a double-clickable icon in the download package will open the Terminal application; you will then need to create a new shell from the 'file' menu. _In Windows_, select "Run..." in the start menu and enter 'cmd' to open a terminal window. _In both cases_, change the current directory (cd) to the place where the simulation is located. You should then be able to start the simulation with:

./platyswim

This should open a new window and use the default set of parameters:

Parameter	Name in Simulation	Default value
Number of larvae	max	1
Speed of larvae	speed	2000 µm/s
Loop	loop	1.6
Spin	spin	0.3
Body radius	radius	90 µm
Delay in Eye response	eyeDelay	80 ms
Origin of light source	light	{10000, 0, 0} µm (E in the equations is set to this vector, after normalization)

Parameters can be changed simply. For example, to have 3 larvae in the simulation:
./platyswim max=3

To change the loop and spin values:
./platyswim loop=1.2 spin=0
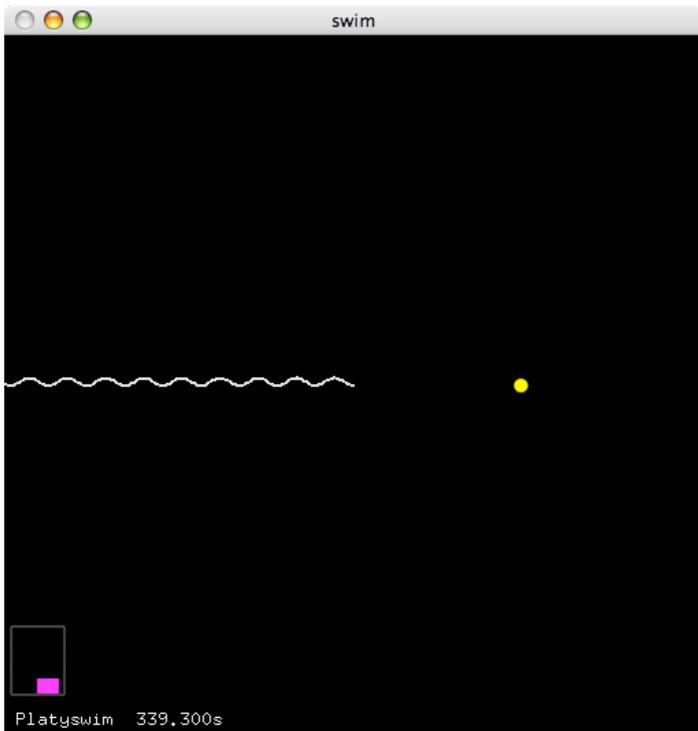
To disable the right eye:
./platyswim eyeR=0

To change the origin of light (without using the mouse):
**./platyswim light="0 1 0"**
(the three components of the vector should be surrounded by double quotes)

Any number of parameters can be changed in this way. The simulation contains other parameters which are not described here. They can be listed with **./platyswim -p**.

The simulation displays the larvae and its trajectory. A translation of camera is operated such that the larvae is kept in the center of the window. The activities of the eyes are displayed in the bottom left corner (left eye in green, right eye in red). The source of light is represented as a yellow dot, and can be changed by holding down the shift key and by clicking the mouse button at the desired position. The view angle can be rotated with the mouse, when the shift key is now depressed.

More advanced controls are accessible from the keyboard: change the simulation speed by pressing 'p' or 'o'. Stop it with 's'. Change the display zoom with '+' and '-'. Reset the position of the larvae with 'z'. A full screen display is accessed with 'f'.
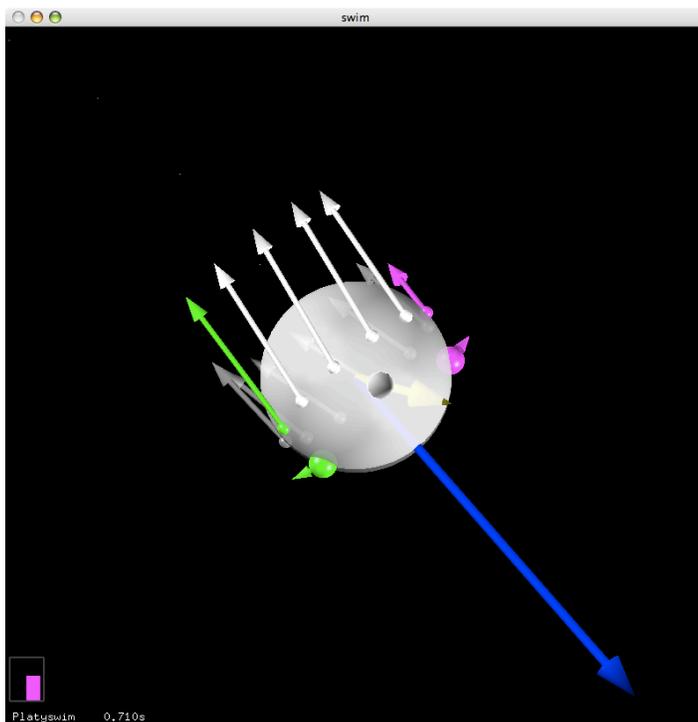
A summary of all the keyboard switches is displayed after pressing 'h'. Pressing 'h' again removes these instructions.

At high magnification, the translucent body is drawn with more details. The ventral side has a brighter jacket, the right eye is red and the left eye is green. A fictious nose was added as a visual cue. The simulation also displays forces produced by individual cells (the ones controlled by the eyes are shown in green and red). The total resulting force on the body is represented by a blue arrow, and the total torque as a yellow arrow. At steady state, the torque arrow indicates the mean direction of motion.

The simulation can also run in a entirely different mode, where the light-source is local. To try it, press 'a'. In this mode, the camera is fixed, and a phototactic larva evolves around the light source.

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