Elliptic non-Euclidean 3D Visualisation Software: User Manual

Table of Contents:

Creating the Visualisation

Details of the objects you wish to visualise need to be specified in a text file that will be passed to the program on the command line. Each line of the text file should contain all required information for one elliptic object as space separated values in the format

x y z radius generation key

where x, y and z are the three-dimensional coordinates of the sphere's centre. x, y, z and radius need to be given as real numbers, while generation should be an integer greater than or equal to 0 and key a string. For example,

1.43 0.866666 3.443 0.2 0 examp

would be a valid line of an input file.

Camera Controls

Changing the position of the camera can help to get a better perspective of the geometry. The camera can be controlled in three ways:

- The camera can be zoomed in or out by using the mouse's scroll wheel or the "+" and "-" keys on the keyboard.
- The position of the camera can be moved by dragging and dropping the cursor across the screen with the mouse's right button held.
- The camera can rotate around the geometry by dragging and dropping the cursors across the screen with the left mouse button held.

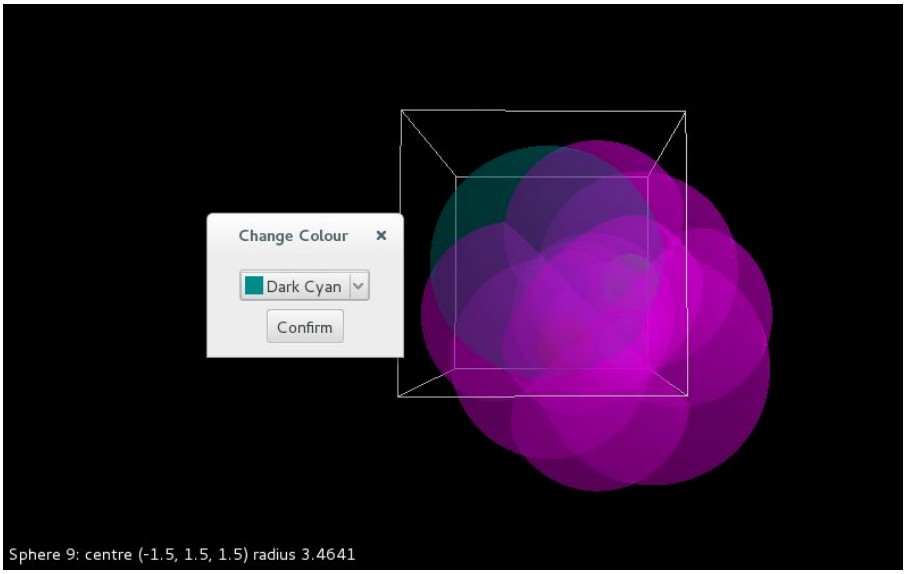
Selecting and Deselecting Objects

Clicking the right mouse button when the cursor is hovered over an object will select it. This selection creates a pop-up menu where certain procedures can be carried out, but these will be explained later in this manual. Deselecting objects can be done either by right clicking an empty point in the visualisation or by hitting the "Esc" key on the keyboard. Sometimes it may be difficult to directly select the desired object in complex ensembles, so use of the "scroll mode" feature may be required. While any object is

selected, moving the scroll wheel or pressing the “+” and “-” keys will allow you to scroll through objects to find the one you wish to select. When you have scrolled to the required object, clicking the right mouse button will select the object and spawn the menu, or alternatively pressing the “Esc” key will cancel scroll mode.

Changing an Object’s Colour and Transparency

The colour and transparency of objects can be changed by the top two options of the menu: “Change Colour” and “Change Transparency”. Clicking either of these will create a pop-up window where the corresponding property can be modified.



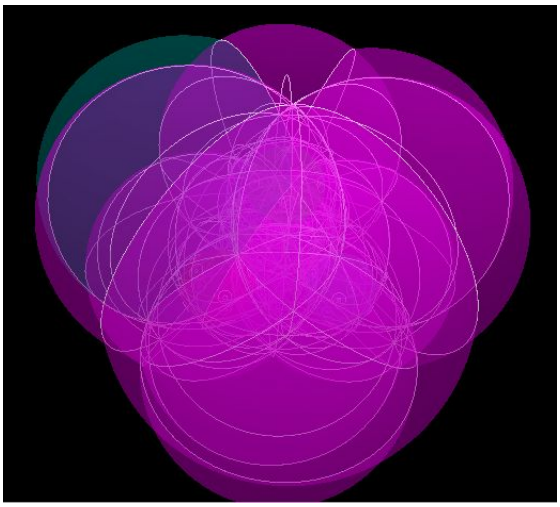
The “Change Colour” pop-up window.

If you are happy with the changes, select the confirm button to save them, else press the x button in the top right of the window to cancel the change.

Getting Intersection Information

Intersection details can be presented in two ways; circles of intersections can either be drawn into the visualisation, or this data can be printed as text. To draw or print intersections for a specific object, select the desired object and choose either the “Draw

Intersections” or “Print Intersections” option as required. Please note that text will be printed both within the visualisation and to the console. If information regarding all intersections within the application is needed, spawning the menu anywhere will provide you with two options: “Print All Intersections” and “Draw All Intersections”. The “Draw All Intersections” function works the same as its object specific counterpart, however “Print All Intersections” only outputs information to the console. Selecting the “Draw Intersections” option for an object twice will clear its intersection details from the visualisation.



An ensemble of spheres with all intersections drawn.

Slideshow Mode

Slideshow mode allows you to view objects of a specified key value one at a time, while information regarding their intersections appears on the screen. Selecting the “Slideshow Mode” option from the menu will display a pop-up dialog box where you may set the desired slideshow parameters.

The “Slideshow Mode” pop-up window.

The following settings will need to be chosen:

- *Key:* the key value you wish to create slides for.
- *Transition:* how you would like to transition to the next slide. Key press transitions display a new slide when the spacebar is hit, whereas time transitions show a new slide every ten seconds.
- *Grouping:* each slide can display objects of the key one at a time or in pairs. Individual grouping will print information for all intersections of the current slide object, while pair grouping will only print details of any intersection between the pair.

Pressing the confirm button will begin the slideshow.

Taking Screenshots

The bottom option of the menu, “Take Screenshot”, will save a .png file of the current display to the “screenshots” folder within its directory. This screenshot will be given a filename depending on the date and time it was taken. A pop-up dialog window will appear to let you know whether the screenshot was saved successfully.