Graphics Systems (LEEC)

4. Geometric Transforms

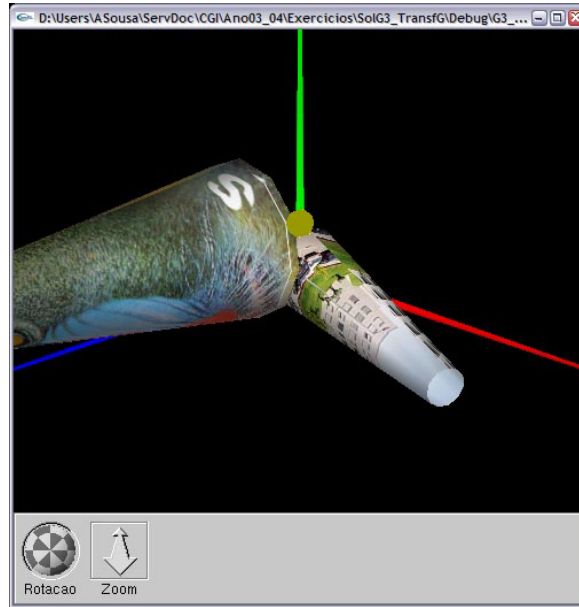The aim of this exercise is to gain experience in the OpenGL Geometric Transforms.

Fig. 1 – OpenGL 3D scene

The 3D scene of Fig. 1 contains two cylinders (i.e. cone shapes), obtained form the instruction `gluCylinder()`. Cylinder nº 2 is covered with the texture "mandril" and is static. Cylinder nº 1 is covered with the FEUP texture and will be animated.

The center of the larger base of cylinder 1 is positioned at (0, 2, 3) and its axis is parallel to Z. The center of the larger base of cylinder 2 is positioned initially at (0, 0, 0) and its axis is parallel to Z.

The aim is to animate cylinder 1 so that it executes a complete rotation over axe Y, being at the end coincident with cylinder 2. The animation should be composed by translation, rotation and scaling.

In the file G3_TransfG.zip it is supplied the set of files required to make the scene of fig.1. Apart from the global variables declaration where the main parameters are defined such as the transformations applied to the cylinders, there is the `void myUpdateTransforms(int dummy)` function which is called in an interval of `mili_secs` and is responsible for updating the

geometric transforms applied to the animated cylinder.

1. Put cylinder 2 in the position referred to above.

2. Complete the function `myUpdateTransforms(int dummy)`, so that cylinder 1:

   a) Makes a 360° rotation over *Y*.
   b) Goes up in *Y* coordinate so that its axe is coincident with cylinder 2.
   c) Is scaled in order to have the same dimensions of cylinder 2.
   d) Is translated so that it coincides with cylinder 2.

3. Complete the `display()` function in order to do the animation of cylinder 1 referred to above.

4. Verify if the calling to functions such as `glPushMatrix()` and `glPopMatrix()` between the drawing of the two cylinders in the `display()` function is required.