

GDDVJ - Maths 2. Project

Visualizing a rotated and projected object

Cecilio Angulo

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Abstract

This project is about how to develop a tool to control the orientation of 3D shapes by using a *keyboard* as input. This feature is implemented in many simple 3D-design software to help users to visualize 3D shapes in several spatial orientations. What your tool does is to define rotations based on the user input, apply the rotation to the 3D model (rotate its frame) and finally redraw the object refreshing the image on the screen. When this process is ran at high rates, it is possible to create the effect of interaction between the user and the 3D model.

1 Project Definition

You will implement a UI (user interface) based on two zones:

- In the left zone a cube appears having to rotate and changing the camera view according to the keyboard.
- 5 panels has be shown on the right. Those panels will contain information of the equivalent attitude representation parametrized as
 - Quaternions
 - Euler principal Angle and Axis
 - Euler angles
 - Rotation vector
 - Rotation matrix

The information must to be updated on run time while moving the cube.

- Every panel except for the rotation matrix has to be editable and must contain a push button. The pushbutton must update the information in the other parametrizations accordingly and must rotate the figure to represent the attitude entered by the user.
- A general reset pushbutton has to be implemented. When pressed, the cube must transform to its original position and all the attitude parametrization must take the corresponding value of zero rotation as well.

A video-presentation has to be delivered where you show the functionalities and the correct operation of the implemented tool.

2 Evaluation

Grades are following ones:

- You are able to build the user interface (5 points)
- You are able to write a rotation and the cube is rotating (5 points)
- You are able to use the keyboard, the cube is rotating and values in the panels are changing accordingly (5 points)
- You are able to modify the point of view and the view of the cube is modify accordingly (5 points)

You must be able to show in your video that all the proposed elements are working in order to get the maximum grade.