

# Matlab project

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## INSTRUCTIONS

### Set values and reset:

When setting values exist, the program reads the data introduced and assigns them to the correspondent field, then obtain the other remaining data by using the last lab functions, e.g given the Euler axis and angles we just need to obtain the quaternions, the Euler angles, rotation vector and rotation matrix (same as in the fourth lab). Just introduce the desired Valid value and click the set button.

Reset, puts all values to zero and the rotation matrix as the identity.

### Dragging the cube:

When dragging the cube we calculate the rotation matrix which comes as the outcome of the mouse being dragged.

To obtain that rotation matrix we have used a function named RotVec (details in the functions document) which allowed us to obtain an axis and an angle, which will we pass as parameters to the `axisangle2matrix` function, returning the rotation matrix.

Now that we have the rotation matrix we are able to obtain the other elements to display on the UI(quaternions, Euler axis, and angle and Euler Angles).

To obtain the new quaternion we have used the function `Two_vec_to_quat`, which will return us the wanted quaternion thanks to the two provided vector as arguments, the initial vector before the rotation and the vector after the rotation of the cube.

To obtain the Euler Axis and angle we used the `RotMatToEulerAxis_Angle` function, which provides an axis and an angle, given a rotation matrix.

And finally, to obtain the Euler Angles we also used the given rotation matrix and the function named `RotMatToEulerAngles` which will return the desired angles.