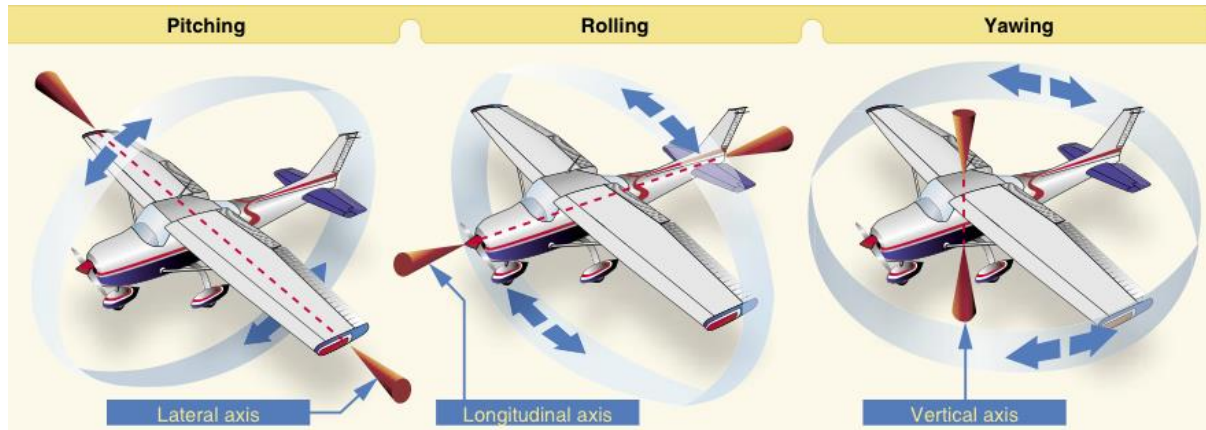# Assignment #01: Plane Rotation

Coursework %: approximately 5%

The purpose of this lab is to familiarise you with orientation and rotation formats

1. This assignment is strictly **individual** (no groupwork).

2. You are required to create a simple model of an aeroplane and use the keyboard and mouse input to display pitch, roll and yaw rotations of the plane.

3. You can use the glm maths library (or other), or create your own. Remember that OpenGL uses column-order matrices so if you are using a math library that assumes row-order, you will have to get the transpose of the resulting matrix. Remember to check the structure of the translation matrix to help figure this out. You can also download the basic cylinder object class from Blackboard, if you would like to use a cylinder to represent the plane.

4. You will be required to **show your working** program to the demonstrator online on the 17th February and he will grade you based on what you show him.

5. You will also be required to submit a pdf file with your **report** on Blackboard by the 17th February. Submissions must be on Blackboard as we will not be accepting submissions via email. Your submission should include a pdf report with a short written description and screen shots, along with the accompanying code snippets. If you fail to show up for the lab or to submit your report on time, you will be reported as absent and will receive a grade of 0%.

6. Be aware that demonstrating a project that was not created by you is considered **cheating** and will be reported as such. The demonstrator will check if you have an understanding of the code that you have written.

Examination

Your program should have the following features:

- Simple representation of a plane with pitch, roll, and yaw rotations, using Euler Angles (~40%)
  (Observe gimbal-lock occurring when 2 axes are aligned)

- Extra Features (~60%):
  o Overcome <mark>gimbal-lock using quaternions</mark> to represent the rotations (~20%)

  o Hierarchical moving elements (e.g., propeller, wheels) (~20%)

  o Switch between <mark>first-person and third-person</mark> views (~20%)

  o Good visual appearance of the plane (e.g., Using 3D model rather than Cylinders) (~20%)
  o Other?

Note: The [approximate] marking scheme provided shows the maximum marks that can be obtained for each section if completed perfectly. Merely attempting a section does not imply the full score indicated.