AE450 Assignment 1

nijatabbasov06

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1 Problem 1

c) The results are the same. For this reason, both of the methods seems reasonable.

2 Problem 2

2.1 a

For the Euler angles provided in the problem statement, we get the same same values after extracting them from DCM. Theoretically, because it is a gimbal lock situation, there should have been a problem because when extracting ϕ and ψ from DCM there is a division by zero. But because we are dividing 0 by 0, MATLAB considers the answer to be 0, which creates no problem.

2.2 b

DCM for 2-3-1 is just yaw, roll, pitch. So, we need to find $C_y(\theta)C_x(\phi)C_z(\psi)$. I found the matrix and implemented that in my code. After extracting the Euler angles, they are the same with the previous angles.

For this problem, both of the ways gave correct result because of the way the matlab handles division by zero. But normally, because of gimbal lock, 2-3-1 representation should give a better result when pitch angle is 90 degree.

3 Problem 3

4 Problem 4