2023 Robotics Assignment I

Spatial Description and Transformation

Due: 2023/10/9 13:00 pm (GMT+8)

PART A (40%)

1. Calculate the rotation matrix R base on the following statement: rotate about axis (1, 5, 2) by 90 degrees.
2. Calculate equivalent angle-axis from rotation matrix R.

$$R = \begin{bmatrix} 0.911 & -0.244 & 0.333 \\ 0.333 & 0.911 & -0.244 \\ -0.244 & 0.333 & 0.911 \end{bmatrix}$$

PART B (60%)

1. {B} rotates about $\hat{X}_A$ by 60 degrees, then rotates about $\hat{Y}_A$ by 30 degrees, then rotates about $\hat{Z}_A$ by 45 degrees, then translates 3 units along $\hat{X}_A$, 6 unit along $\hat{Y}_A$, 9 unit along $\hat{Z}_A$. Find ${}^{A}_{B}T$.
2. {C} rotates about [1, 1, 1] by 60 degrees, then rotates about [1, -1, 2] by 30 degrees, then rotates about [-1, -3, 1] by 45 degrees. Find ${}^{origin}_{C}T$.

Submission

Please convert your report into a PDF file, submit to the NTU COOL.

Name your PDF file as <STUDENT_ID>_HW1.pdf. For example, R12345678_HW1.pdf