HACETTEPE UNIVERSITY

DEPARTMENT OF GEOMATICS ENGINEERING

GMT225

REFERENCE COORDINATE SYSTEMS

Assignment #2

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1. INTRODUCTION

In this code, our first aim is to find the new positions of the points given to us on the rotated axes by rotating the coordinates given to us.

2. METHODOLOGY

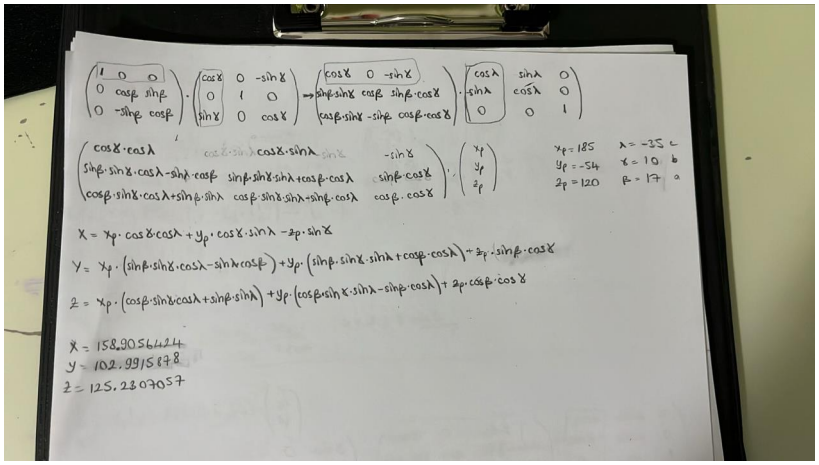
While writing this code, I first imported the numpy library. Then I wrote the code that would input the first X, Y, Z coordinates of the point, the rotation angle values, and whether the rotation was clockwise or counterclockwise as input values. Then I wrote the rotation functions as matrices for each axis. Since we could not use the degree angles we entered in each rotation function in the numpy library, I added the code line that converted them to radians. In the last function, I wrote the coordinate transforms as multiplication.

3. RESULTS AND DISCUSSIONS

As a result, I solved the part 1 of the homework on paper with the given values and given pain points as requested and I ran the code with the same values to determine whether the code worked correctly and both results were the same.

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   JUPYTER   COMMENTS

PS C:\Users\osman\OneDrive\Masaüstü\referanskoordinat> python Burak_ÜÇÜNCÜ_rotations.py
enter the coordinate X: 185
enter the coordinate Y: -54
enter the coordinate Z: 120
enter the degree lambda: 35
enter the direction of rotation lambda (ccw or cw): cw
enter the degree delta: 10
enter the direction of rotation delta (ccw or cw): ccw
enter the degree beta: 17
enter the direction of rotation beta (ccw or cw): ccw
Yeni koordinatlar (X', Y', Z'): [158.9056424  102.99158781 125.23070572]
PS C:\Users\osman\OneDrive\Masaüstü\referanskoordinat>
```



4. ATTACHMENTS

Functions:

rotation_x(beta_deg):

rotation_y(delta_deg):

rotation_z(lambda_deg):

total_rotation_matrix(lambda_deg, delta_deg, beta_deg):

transform_coordinates(Rotation_N, r_point):