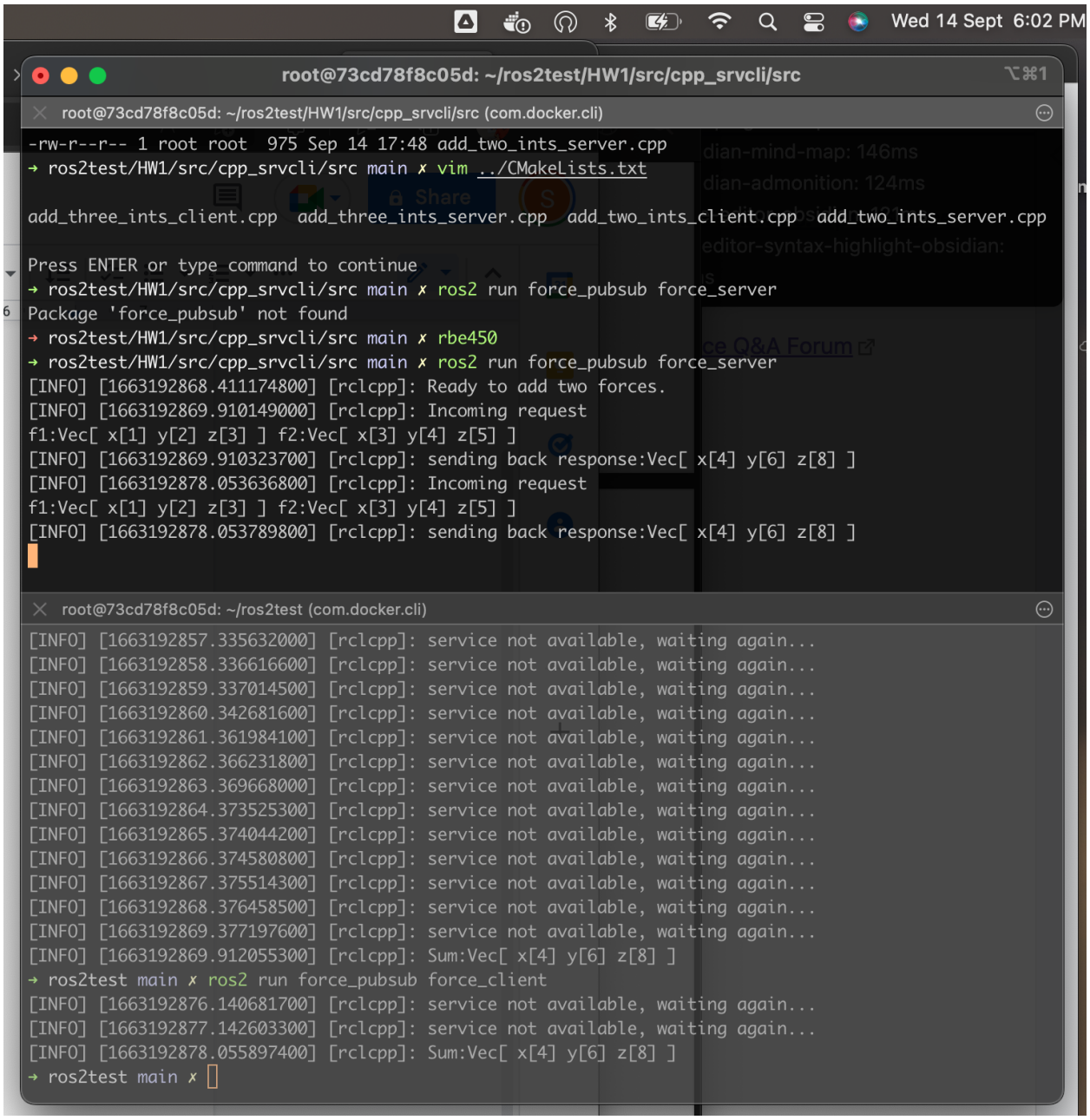
Part 2 -- ROS Assignment

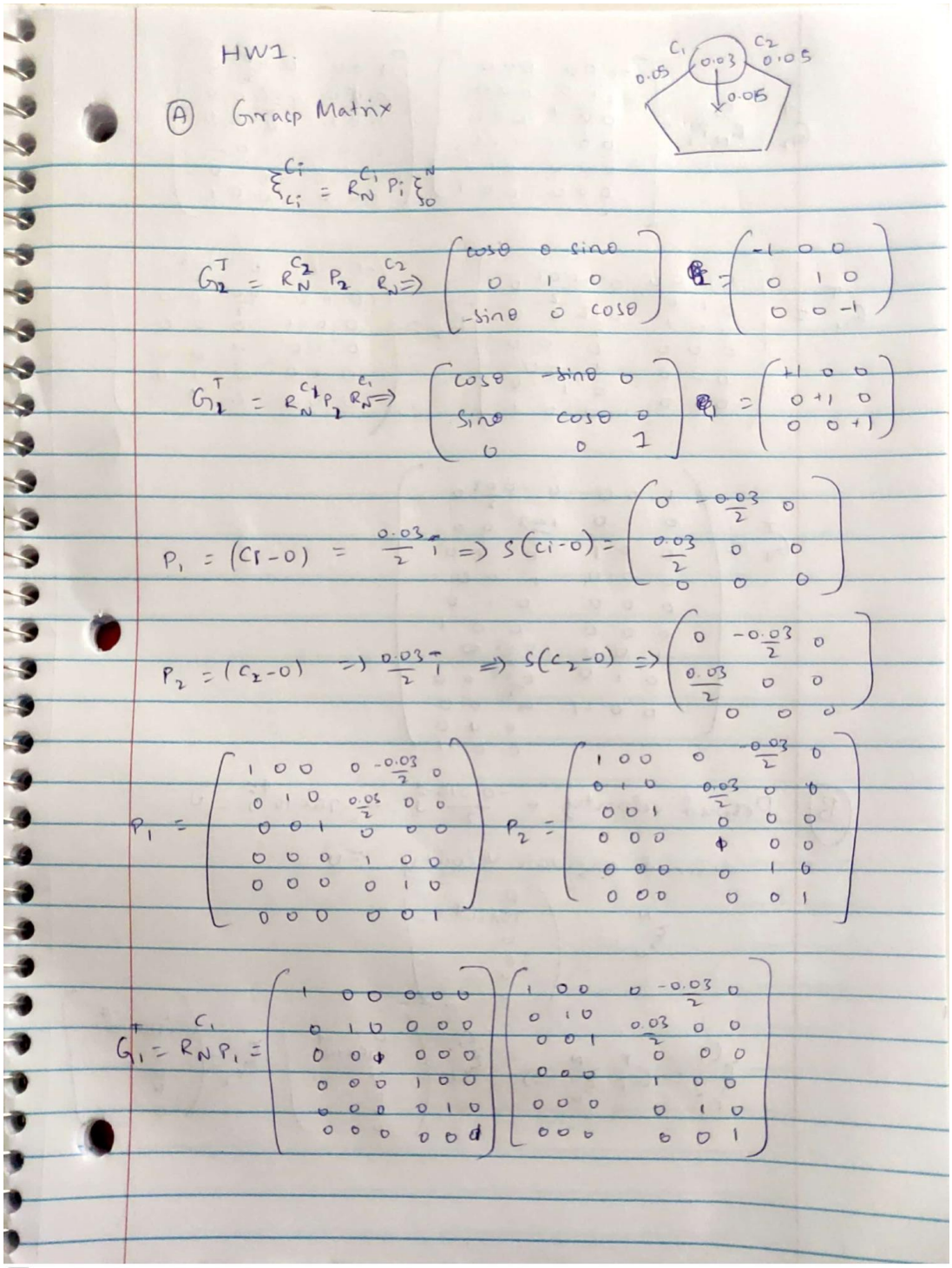
GitHub link for all the codes can be found here

Screen shot of the server and client pair. Top terminal is server and bottom terminal is client



Part I

Assuming that object has to be moved by a distance of 0.015m



$$G_{T_2} = {}^{C_2}R_N P_2 = \begin{bmatrix} -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 & -\frac{0.03}{2} & 0 \\ 0 & 1 & 0 & \frac{0.03}{2} & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

$$G_{T_1} = \begin{bmatrix} 1 & 0 & 0 & 0 & -\frac{0.03}{2} & 0 \\ 0 & 1 & 0 & \frac{0.03}{2} & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad G_{T_2} = \begin{bmatrix} -1 & 0 & 0 & 0 & \frac{0.03}{2} & 0 \\ 0 & 1 & 0 & \frac{0.03}{2} & 0 & 0 \\ 0 & 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 \end{bmatrix}$$

$$G_B = \begin{bmatrix} 1 & 0 & 0 & 0 & -\frac{0.03}{2} & 0 \\ 0 & 1 & 0 & +\frac{0.03}{2} & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ -1 & 0 & 0 & 0 & \frac{0.03}{2} & 0 \\ 0 & 1 & 0 & \frac{0.03}{2} & 0 & 0 \\ 0 & 0 & -1 & -1 & 0 & 0 \\ & & & 0 & 1 & 0 \\ & & & 0 & 0 & -1 \end{bmatrix}$$

(B) Desired velocity $= \frac{-0.015}{2}\hat{j} = 75\times10^{-4}\hat{j} = \bar{U}$

desired angular velocity $= 0$

$$\xi_0^N = \begin{pmatrix} 0 \\ -75\times10^{-4} \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

$$\xi_{C_i}^{C_i} = G_i^T \xi_0^N \Rightarrow \xi_{C_1}^{C_1} = \begin{pmatrix} 0 \\ -75\times10^{-4} \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \quad \xi_{C_2} = \begin{pmatrix} 0 \\ 75\times10^{-4} \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$