5. Let the ith Affine matrix lb
$$\begin{bmatrix} A_{11} & A_{12} & A_{13} & t_x \\ A_{21} & A_{22} & A_{23} & t_y \\ A_{31} & A_{32} & A_{33} & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$^{i}A_1 = [A_{11} \ A_{12} \ A_{13}]$

$^{i}A_2 = [A_{21} \ A_{22} \ A_{23}]$

$$\tilde{x}_{ij} = {}^{i}A_1 P_j$$

Now, the matrix Peq^n form will be

$$\tilde{W} = A S$$

$\underset{2N \times n}{\swarrow}$

$$= \begin{pmatrix} {}^{i}A_1 \\ \vdots \\ {}^{i}A_2 \end{pmatrix} \big(P_1 \,|\, P_2 \,|\, P_3 \cdots |\, P_n \big)$$

$\underset{3 \times n}{\underbrace{\qquad}}$

$\longrightarrow 2N \times 3$

$$\tilde{W} = U_{2N \times 2N} \, D_{2N \times n} \, (V_{n \times n})^T$$

$$= U_{2N \times 3} \, D_{3 \times 3} \, (V_{n \times 3})^T \qquad \text{taking rank-3 approximation}$$

$$= U_{2N \times 3} \, \underbrace{D^{1/2}_{3 \times 3}}_{A'} \, \underbrace{D^{1/2}_{3 \times 3} (V_{n \times 3})^T}_{S'} \qquad \begin{array}{l}(\because \text{ the matrix in RHS (AS) has} \\ \text{rank} = 3)\end{array}$$

$$A = A' Q \qquad S = Q^{-1} S'$$

Here, we does not have any constraints on $^{i}A_1$ or $^{i}A_2$ to find out Q (not ~~the~~ similiar to the case ~~when~~ of 3D rigid motion as solve in the class). Because here, matrix A has 6-degree of freedom.

~~Here, we have 6-degree of freedom just to find A~~
~~and for the whole affine matrix~~

So, we can't find S and A

and since, we can't find A $\therefore$ we also can't find the whole Affine matrix.

$\therefore$ We can't find the point coordinates and the affine object motion.