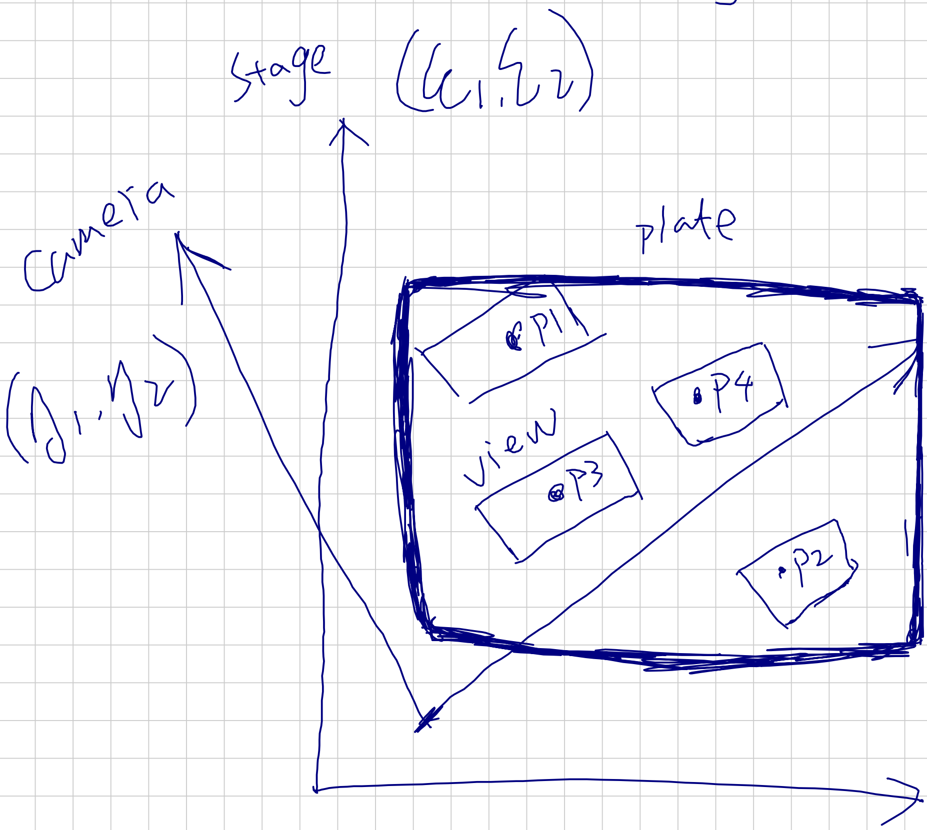
Stitching Transform



(where is the view center during movement?)

the center unchange

$$R^2 \in (x_1, x_t)$$

$$\vec{\xi} \xrightarrow{\vec{A}} \vec{\eta}$$, then load into big frame

Required parameter:

① $\vec{\xi}_1$: pre obtain

② $\vec{A}$: measure from MM

10X obtain from MM

$$A = \begin{bmatrix} -0.64420 & -0.00045 & 0. \\ 0.00005 & 0.64357 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

① Stage $\leftarrow$ camera

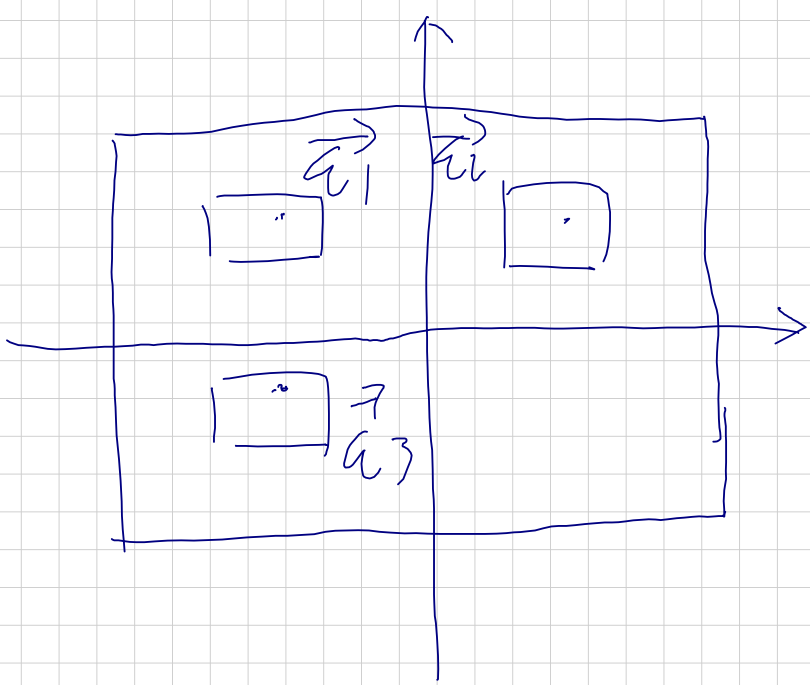
$$\vec{\varepsilon} = \vec{A} \cdot \vec{y}$$

$$\vec{\varepsilon} = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ 1 \end{bmatrix}$$

$$\vec{y} = \begin{bmatrix} y_1 \\ y_2 \\ 1 \end{bmatrix}$$

② Camera $\leftarrow$ stage

$$\vec{y} = \vec{A}^{-1} \cdot \vec{\varepsilon}$$



Calibration Stage

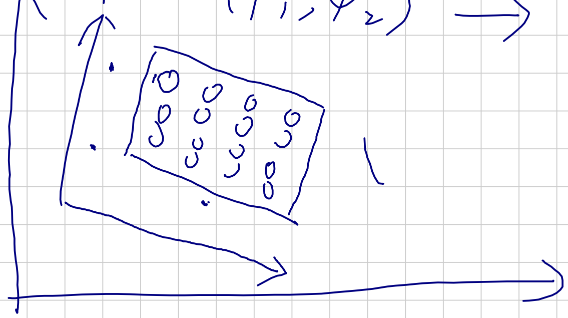
if we define the view center us the stage center, the stage center will be view center

B

hat is the coordinate of well plate in stage

stage(ξ_1, ξ_2)

plate(φ_1, φ_2) → reference



40x

Required

① $\vec{\xi}_{old}$

② $\vec{\varphi}_{old}$

③ $\vec{\varphi}_{new}$

calibration 1 well

$$\frac{\vec{\xi}_{new}}{\vec{\varphi}_{new}} = \frac{\vec{\xi}_{old}}{\vec{\varphi}_{old}}$$

All is mm, mm consider point

Wall plate

$\vec{\varphi}(\varepsilon_1, \varepsilon_2, 1)$

Calibration Plate

$\vec{\beta}(\varepsilon_1, \varepsilon_2, 1)$

3 point DOF = 6

$$\begin{cases} \hat{\vec{\varphi}} = \vec{B} \cdot \vec{\varphi} \\ \hat{\vec{\beta}} = \vec{B} \cdot \vec{\beta} \end{cases} \rightarrow \vec{B} = [\hat{\vec{\beta}}_1, \hat{\vec{\beta}}_2, \hat{\vec{\beta}}_3] \cdot [\vec{\beta}_1, \vec{\beta}_2, \vec{\beta}_3]^{-1}$$

$$\rightarrow \hat{\vec{\varphi}} = [\hat{\vec{\beta}}_1, \hat{\vec{\beta}}_2, \hat{\vec{\beta}}_3] \cdot [\vec{\beta}_1, \vec{\beta}_2, \vec{\beta}_3] \cdot \vec{\varphi}$$

$$\begin{bmatrix} \hat{x} \\ \hat{y} \\ 1 \end{bmatrix} = \begin{bmatrix} \hat{\varepsilon}_{11} & \hat{\varepsilon}_{12} & \hat{\varepsilon}_{13} \\ \hat{\varepsilon}_{21} & \hat{\varepsilon}_{22} & \hat{\varepsilon}_{23} \\ 1 & 1 & 1 \end{bmatrix} \cdot \begin{bmatrix} \varepsilon_{11} & \varepsilon_{12} & \varepsilon_{13} \\ \varepsilon_{21} & \varepsilon_{22} & \varepsilon_{23} \\ 1 & 1 & 1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$