

from trigonometry import sin, cos

$$M = \begin{bmatrix} S_{v_1} & S_{v_2} \\ S_{v_2} & S_{v_3} \end{bmatrix} \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix}$$

$$v = \begin{bmatrix} (M_{1,1}, M_{2,1})^T TP & (M_{1,2}, M_{2,2})^T TP \end{bmatrix}$$

where

- $S_v \in \mathbb{R}^3$
- $\theta \in \mathbb{R}$
- $TP \in \mathbb{R}^{2 \times 3}$