from trigonometry import sin, cos

$$\begin{aligned} M &= \begin{bmatrix} S_{-}v_{1} & S_{-}v_{2} \\ S_{-}v_{2} & S_{-}v_{3} \end{bmatrix} \begin{bmatrix} cos(theta) & -sin(theta) \\ sin(theta) & cos(theta) \end{bmatrix} \\ v &= \begin{bmatrix} \left(M_{1,1}, M_{2,1}\right)^{T} TP & \left(M_{1,2}, M_{2,2}\right)^{T} TP \end{bmatrix} \end{aligned}$$

where

$$TP \in \mathbb{R}^{2 \times 3}$$
 $theta \in \mathbb{R}$
 $S_{v} \in \mathbb{R}^{3}$