

1. Continuing your Lab Assignment 1, (same test images)

[10 points]

Show the reflection in terms of combination of rotation and scaling transformations.

2. Similarly,

[10 points]

Show the shear in terms of combination of rotation and scaling transformations.

i.e. prove the following decomposition from the lectures.

$$\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} = \mathbf{R}_2 \begin{bmatrix} \sigma_1 & 0 \\ 0 & \sigma_2 \end{bmatrix} \mathbf{R}_1$$

$$= \begin{bmatrix} 0.8507 & -0.5257 \\ 0.5257 & 0.8507 \end{bmatrix} \begin{bmatrix} 1.618 & 0 \\ 0 & 0.618 \end{bmatrix} \begin{bmatrix} 0.5257 & 0.8507 \\ -0.8507 & 0.5257 \end{bmatrix}$$

$$= \text{rotate } (31.7^\circ) \text{ scale } (1.618, 0.618) \text{ rotate } (-58.3^\circ).$$