

SUMMARY SHEET OF LINEAR TRANSFORMATIONS

<u>Name</u>	<u>Representative Matrix</u>
- Identity	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
- Scaling	$\begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}$ $0 < k < 1$ contraction $k > 1$ dilation
- Projection onto line L ($\text{proj}_L(\vec{x})$)	$\begin{bmatrix} u_1^2 & u_1 u_2 \\ u_1 u_2 & u_2^2 \end{bmatrix}$ $\ u\ = 1$
- Reflection about L ($\text{ref}_L(\vec{x})$)	$2 \text{proj}_L(\vec{x}) - \vec{x}$
- Projection onto plane V perpendicular to line L ($\text{proj}_V(\vec{x})$)	$\vec{x} - \text{proj}_L(\vec{x})$
- Reflection about plane V perpendicular to line L	$\vec{x} = 2 \text{proj}_V(\vec{x})$
- Counterclockwise rotation through angle θ	$\begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$
- Rotations w/ a scaling	$\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$ $a^2 + b^2 \neq 1$

(over)

Name

Representative Matrix

Horizontal shear

$$\begin{bmatrix} 1 & k \\ 0 & 1 \end{bmatrix}$$

Vertical shear

$$\begin{bmatrix} 1 & 0 \\ k & 1 \end{bmatrix}$$