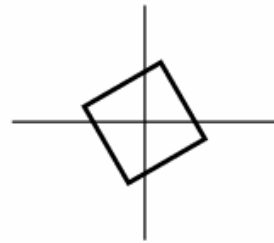
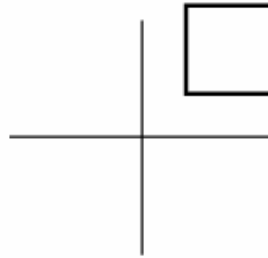


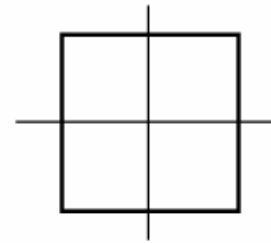
Summary of 2D Transformations



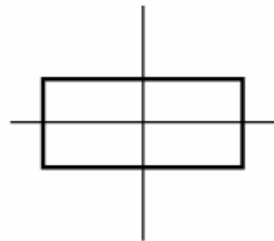
rotation



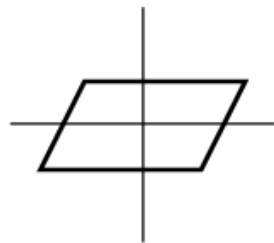
translation



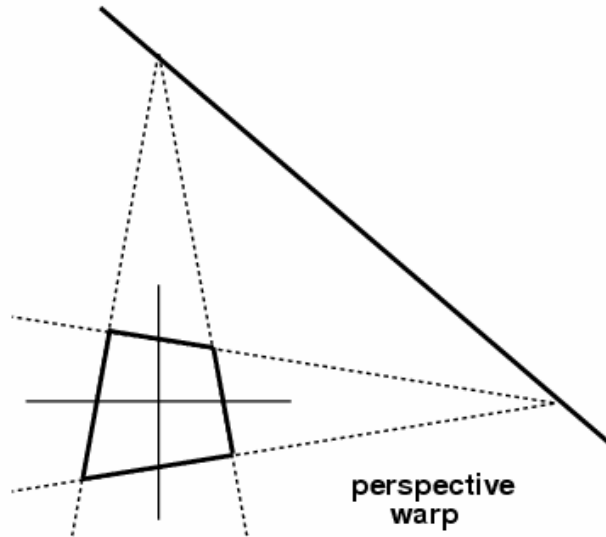
scale



aspect ratio



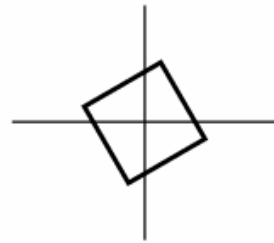
skew



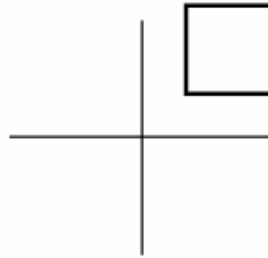
perspective
warp

Summary of 2D Transformations

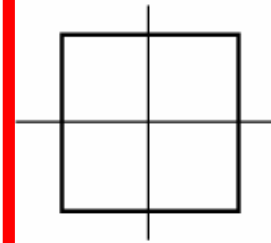
Euclidean



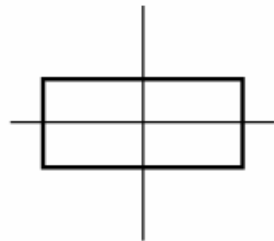
rotation



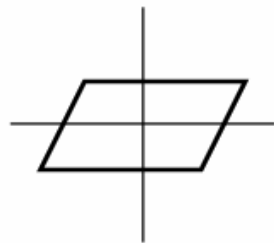
translation



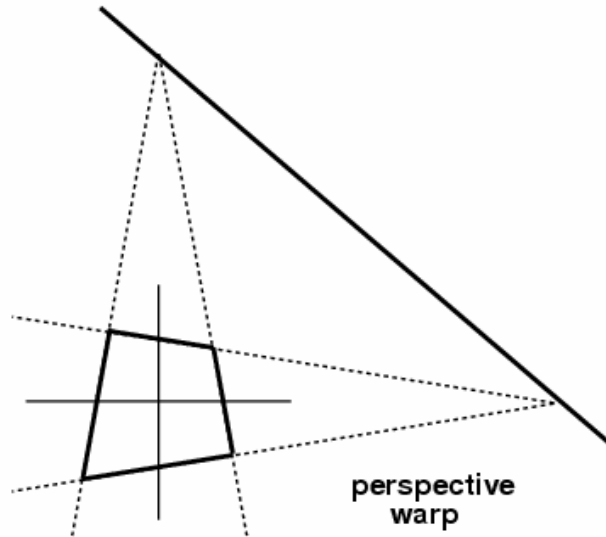
scale



aspect ratio



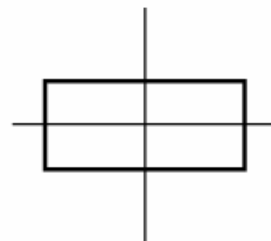
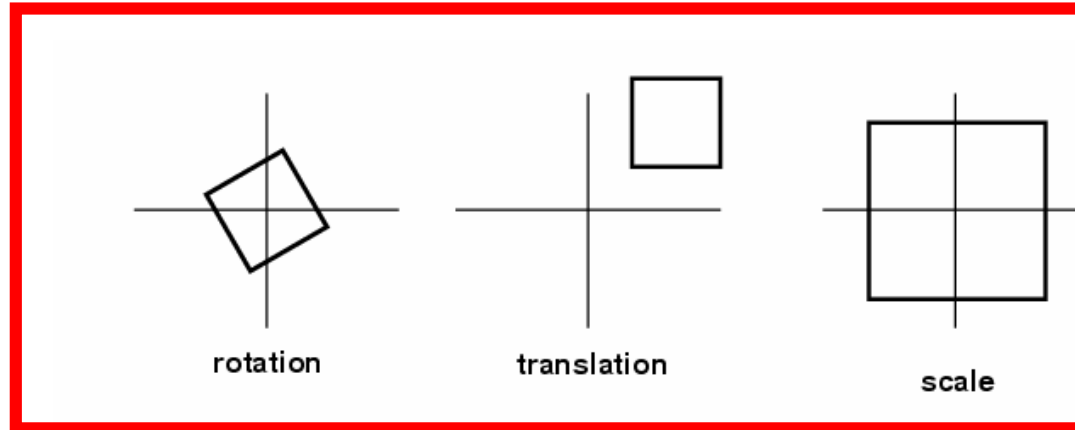
skew



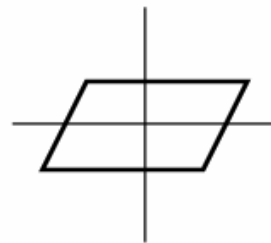
perspective
warp

Summary of 2D Transformations

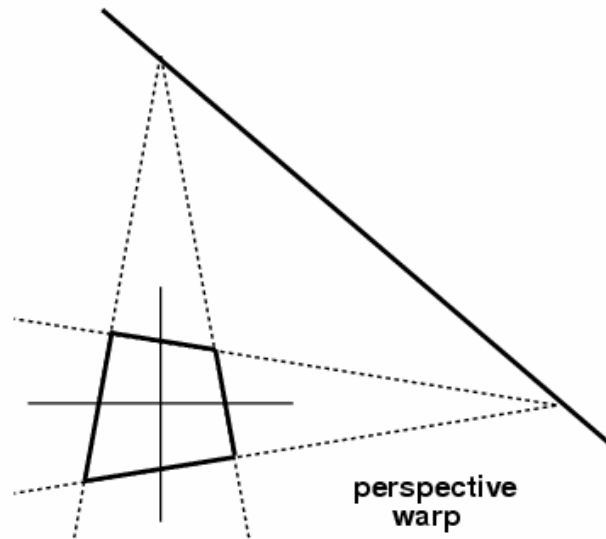
Similarity



aspect ratio



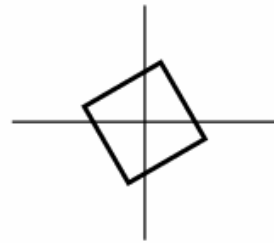
skew



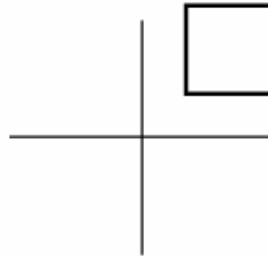
perspective
warp

Summary of 2D Transformations

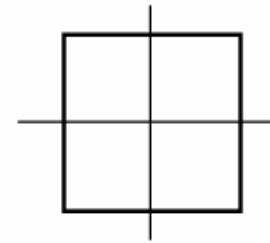
Affine



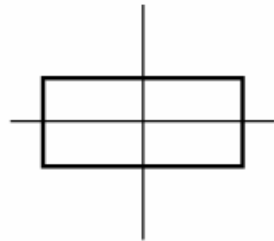
rotation



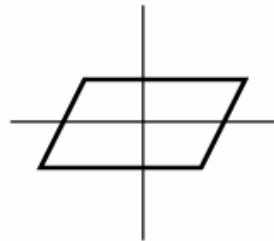
translation



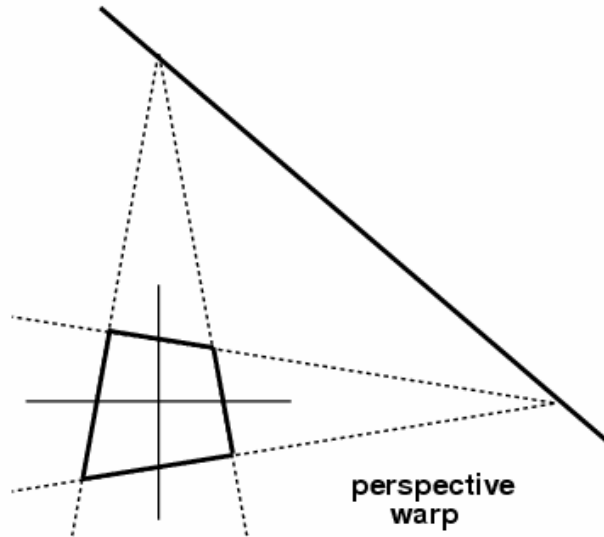
scale



aspect ratio



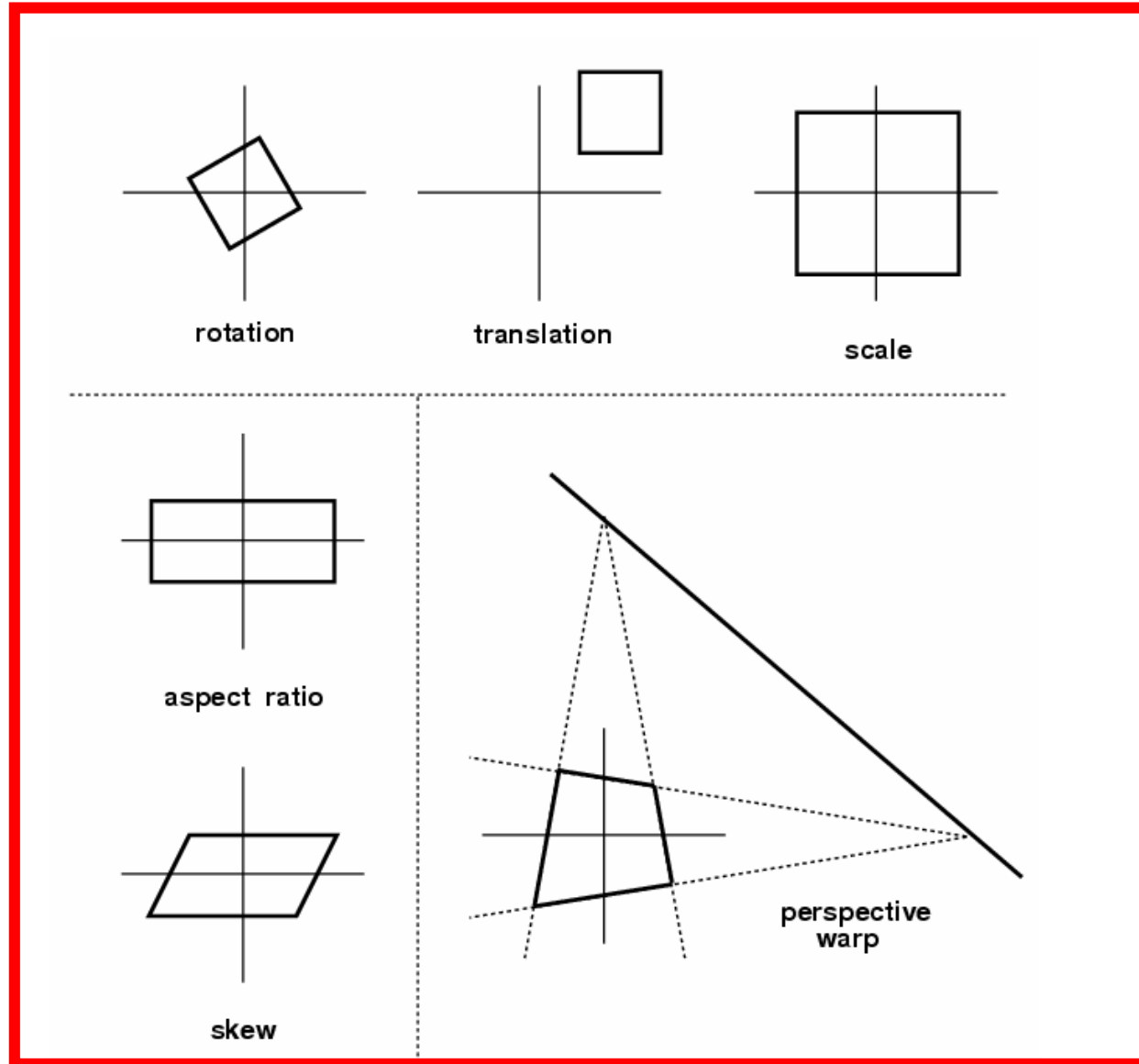
skew





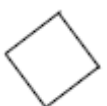

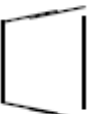
perspective
warp

Summary of 2D Transformations

Projective



Summary of 2D Transformations

| Name | Matrix | # D.O.F. | Preserves: | Icon |
|-------------------|---|----------|-------------------|---|
| translation | $\begin{bmatrix} \mathbf{I} & \mathbf{t} \end{bmatrix}_{2 \times 3}$ | 2 | orientation + ... |  |
| rigid (Euclidean) | $\begin{bmatrix} \mathbf{R} & \mathbf{t} \end{bmatrix}_{2 \times 3}$ | 3 | lengths + ... |  |
| similarity | $\begin{bmatrix} s\mathbf{R} & \mathbf{t} \end{bmatrix}_{2 \times 3}$ | 4 | angles + ... |  |
| affine | $\begin{bmatrix} \mathbf{A} \end{bmatrix}_{2 \times 3}$ | 6 | parallelism + ... |  |
| projective | $\begin{bmatrix} \mathbf{H} \end{bmatrix}_{3 \times 3}$ | 8 | straight lines |  |