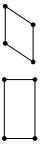
Group	Matrix	Distortion	Invariant properties
Projective 8 dof	$\begin{matrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{matrix}$		Concurrency, collinearity, **order of contact**: intersection (1 pt contact); tangency (2 pt contact); inf ections (3 pt contact with line); tangent discontinuities and cusps. cross ratio (ratio of ratio of lengths).
Aff ne 6 dof	$\begin{matrix} a_{11} & a_{12} & t_x \\ a_{21} & a_{22} & t_y \\ 0 & 0 & 1 \end{matrix}$		Parallelism, ratio of areas, ratio of lengths on collinear or parallel lines (e.g. midpoints), linear combinations of vectors (e.g. centroids). The line at inf nity, l_∞ .
Similarity 4 dof	$\begin{matrix} sr_{11} & sr_{12} & t_x \\ sr_{21} & sr_{22} & t_y \\ 0 & 0 & 1 \end{matrix}$		Ratio of lengths, angle. The circular points, I, J (see section 2.7.3).
Euclidean 3 dof	$\begin{matrix} r_{11} & r_{12} & t_x \\ r_{21} & r_{22} & t_y \\ 0 & 0 & 1 \end{matrix}$		Length, area