Geometric primitives #

2D point

$$x = \begin{bmatrix} x \\ y \end{bmatrix} : \; x = (x, y) \in \mathbb{R}^2$$

3D point

$$x = \begin{bmatrix} x \\ y \\ z \end{bmatrix} : \; x = (x, y, z) \in \mathbb{R}^3$$

2D Planar transformations → 3D

Transformation	matrix	#DoF	Preserves	Icon
Translation	$[I \mid t]_{2\times3}$ → 3×4	2 → 3	orientation	
Euclidean	$[R \mid t]$	3 → 6	lengths	
Similarity	$[sR \mid t]$	4 → 7	angles	
Affine	$[A]$	6 → 12	parallelism	
Projective	$[\tilde{H}]$	8 → 15	straight lines	

I → identidad
t → translation
s → scale
A → afin
R → rotation