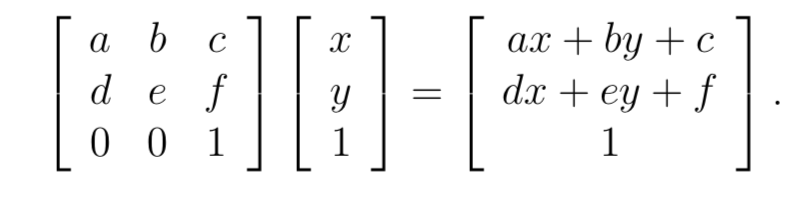
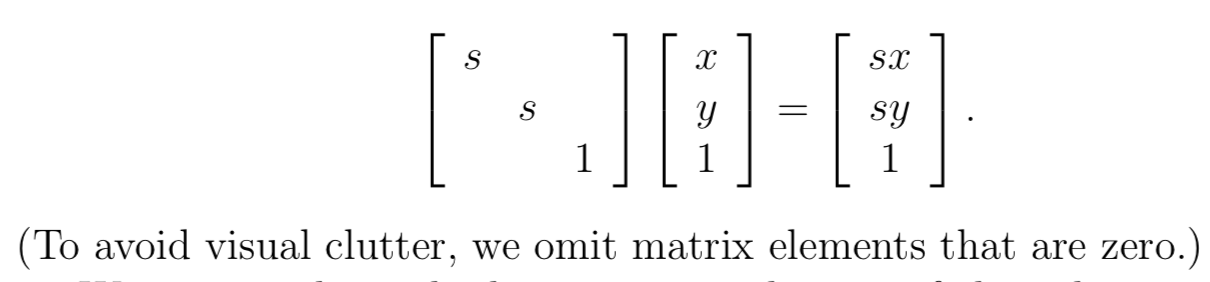
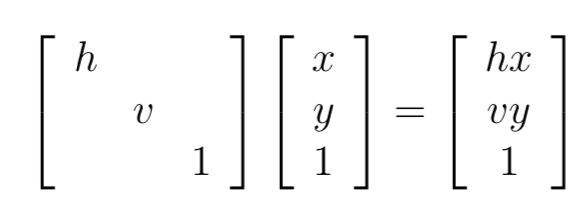
3 × 3 transformation ma- trix applied to a 3-element homogeneous column vector representing a 2-D point will generate a new 3-element homogeneous column vector represent- ing the transformed 2-D point

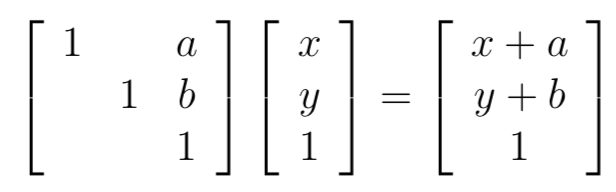
Scale



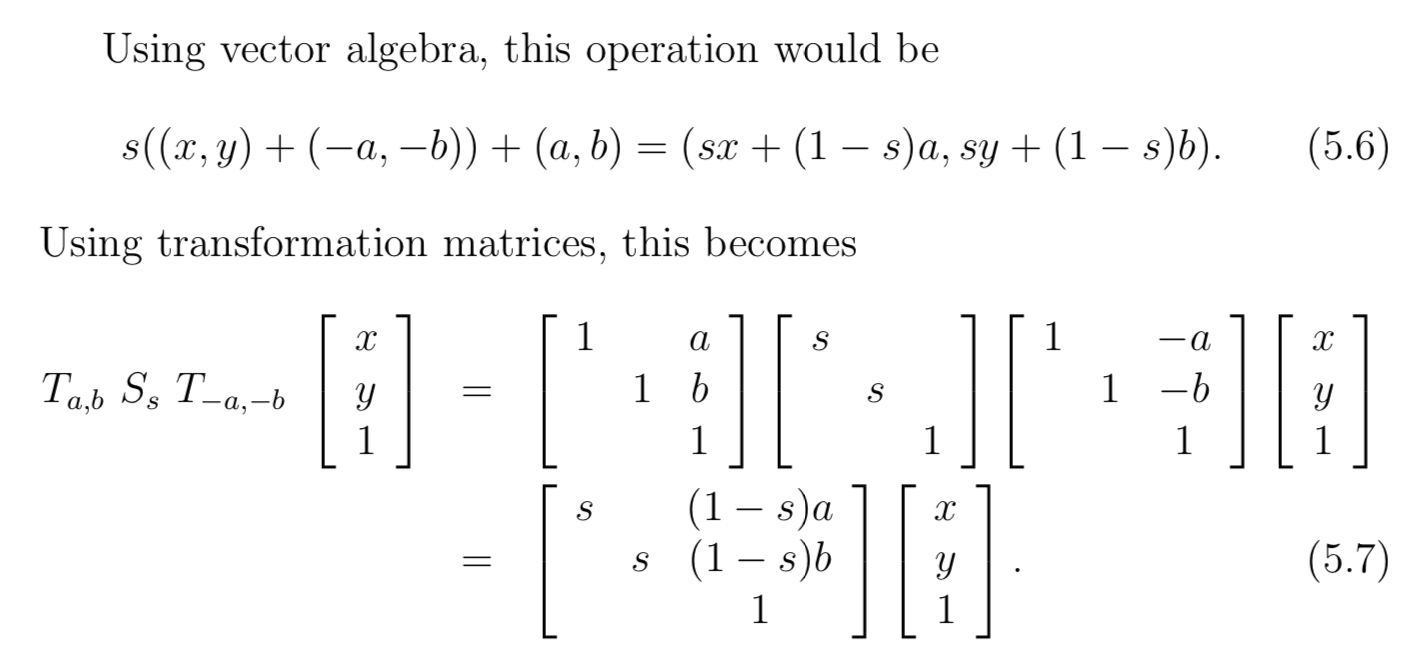




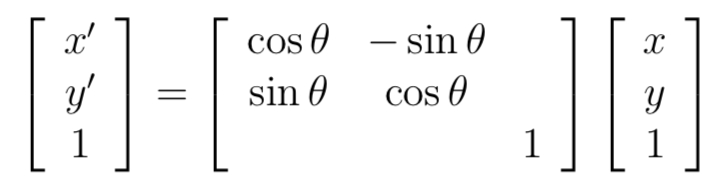
Translation



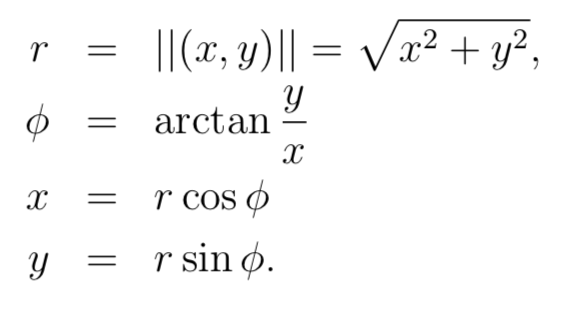
Relative Scale

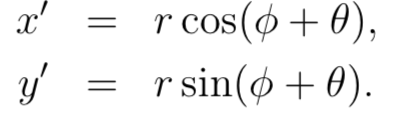
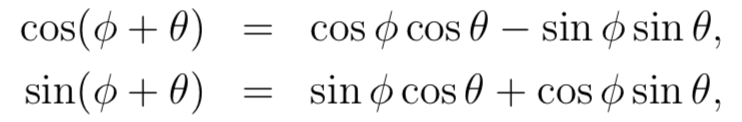
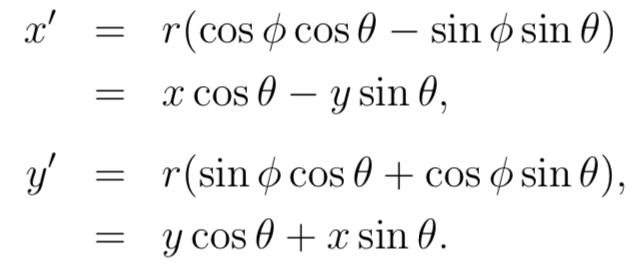


Rotation



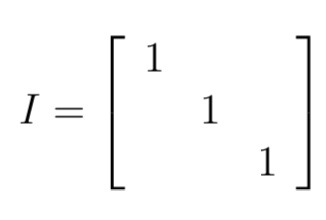
Polar Coordinate (r, φ)

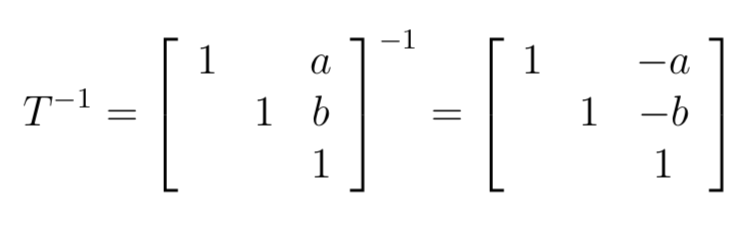


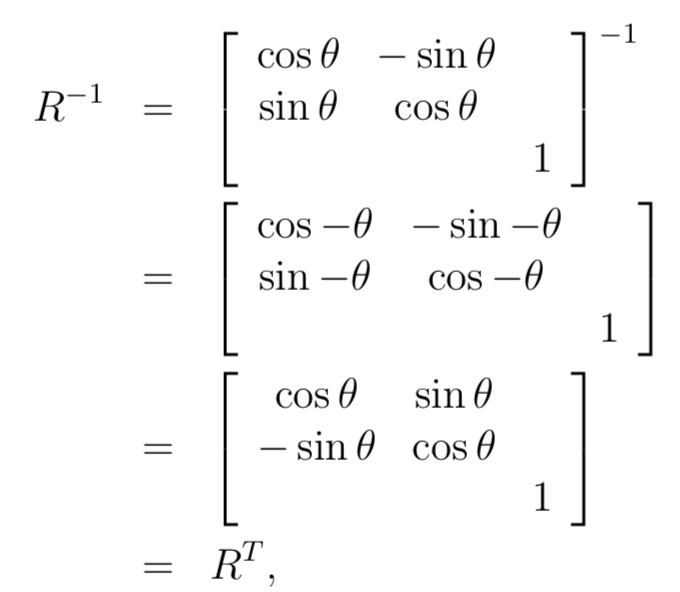
Inverse Transformation

Identity matrix

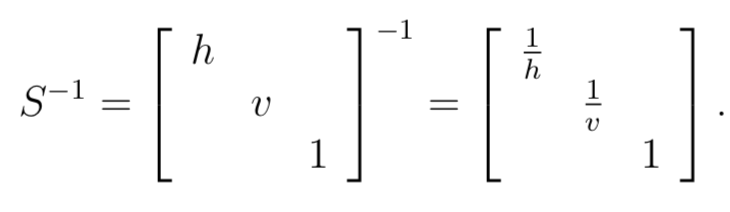
Opposite direction



R is a rotation matrix with angle

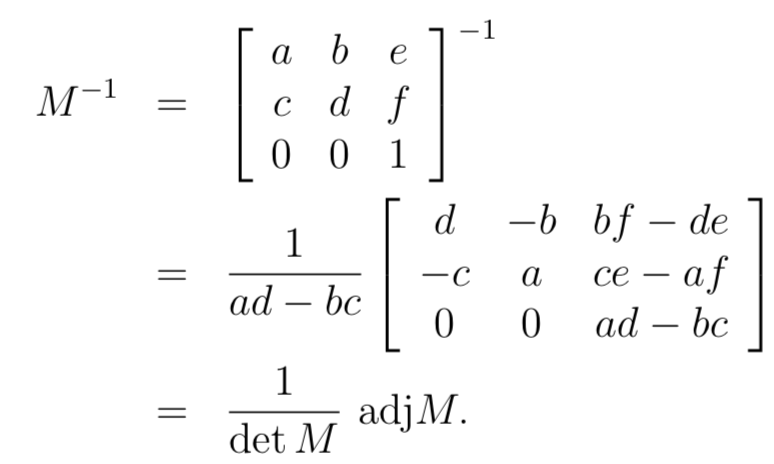


Scale matrix S might not be invertible, if it is then

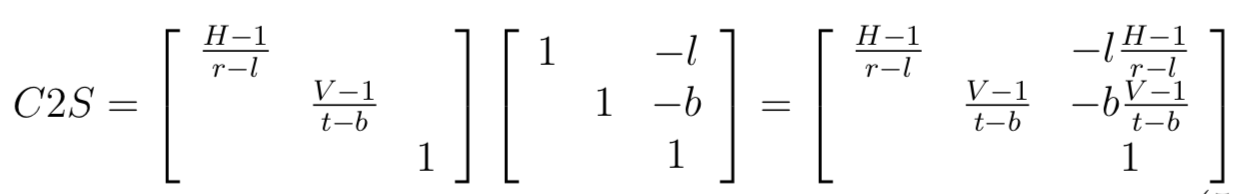


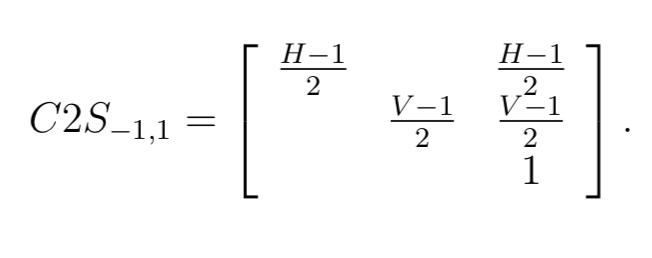
If it is not, then it is a projection

If an arbitrary 3 × 3 transformation matrix M is invertible, then its inverse is

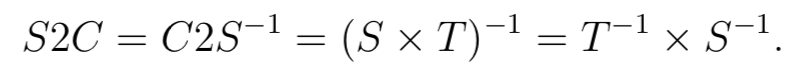


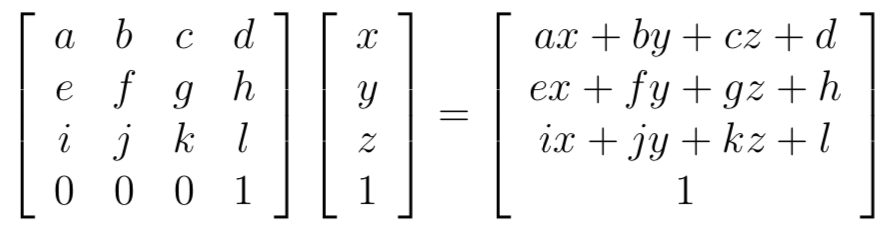
CanvasToScreenTransformation

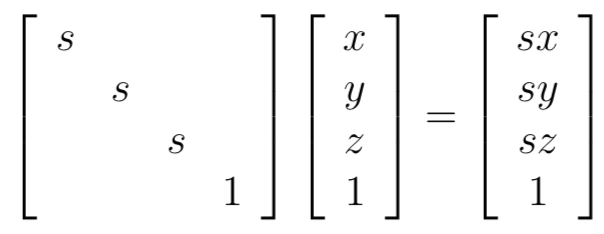
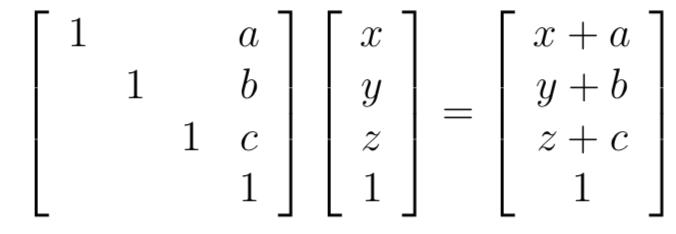
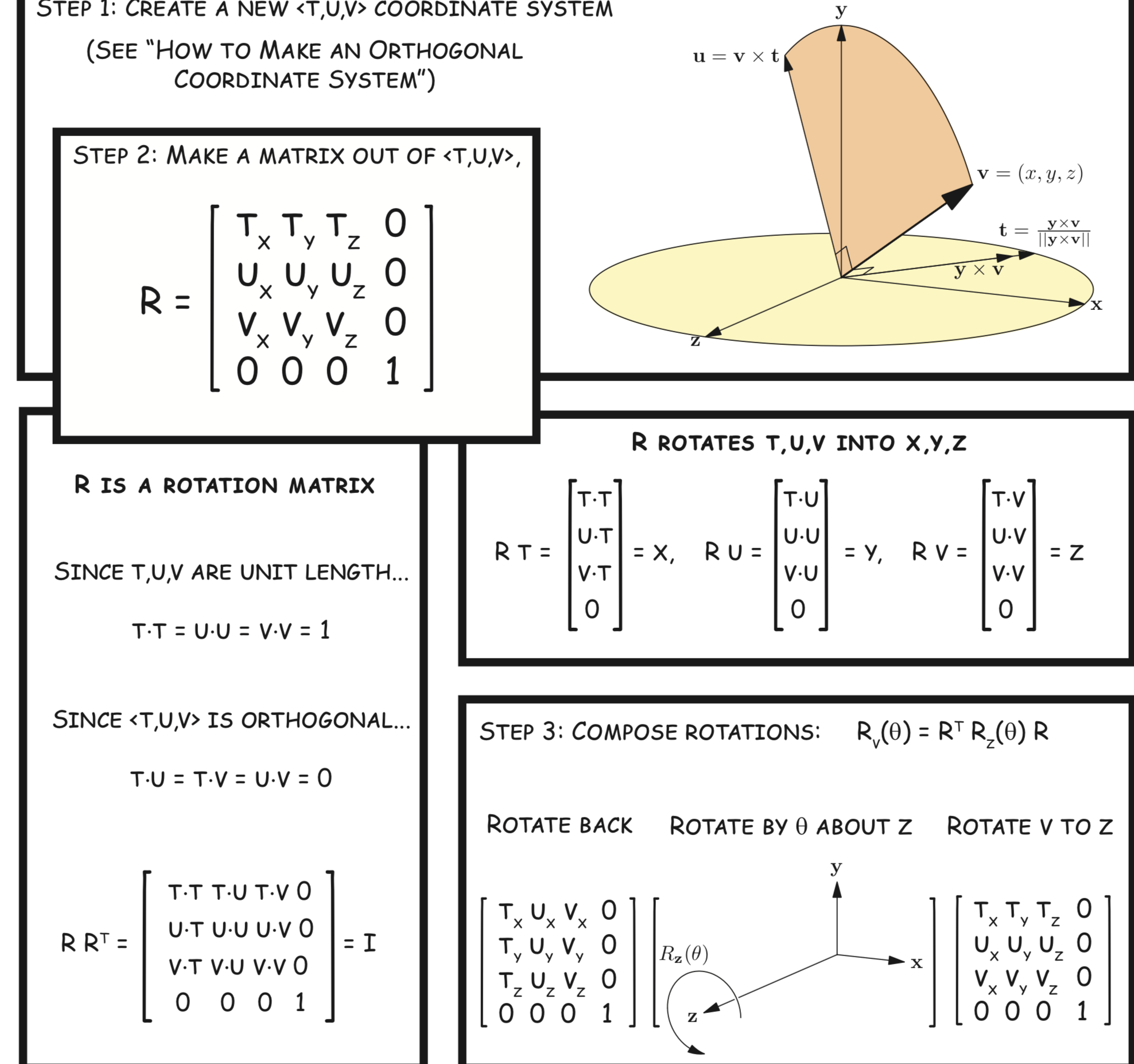
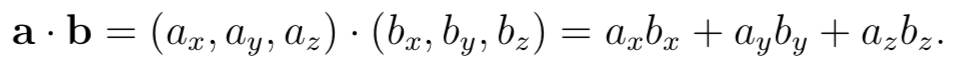
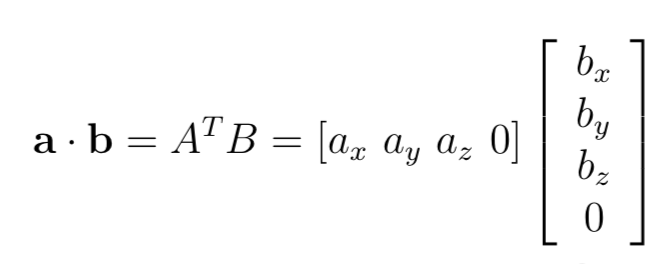
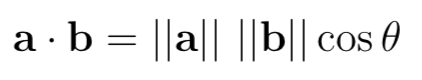
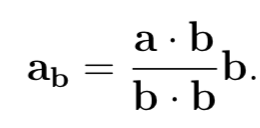


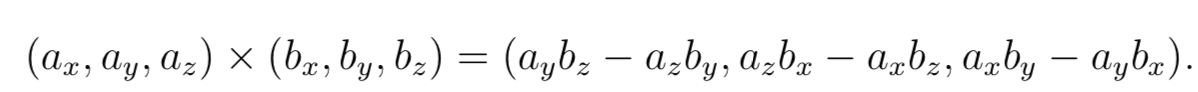
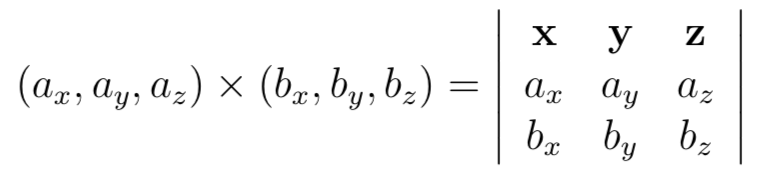
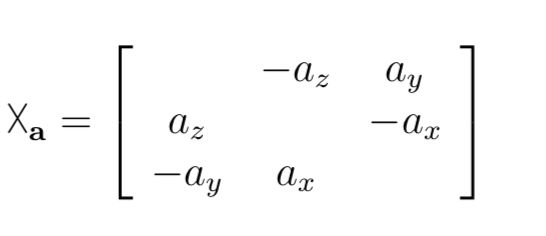
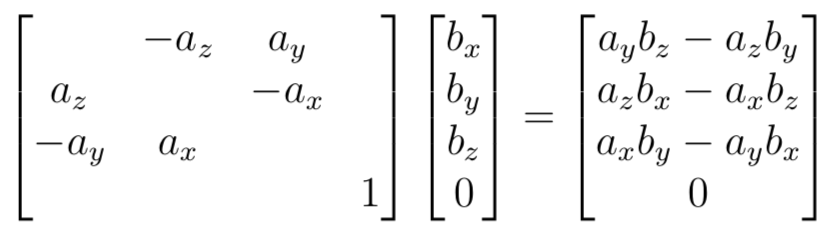


Plotting fields

3D transformational geometry

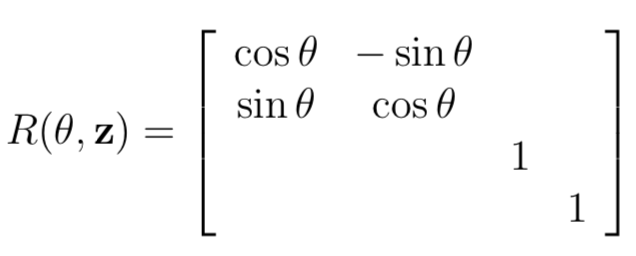
Scale

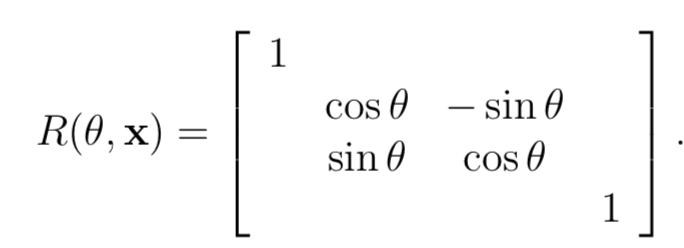
CROSS PRODUCT  Given the vector a = (ax,ay,az), the skew-symmetric matrix 

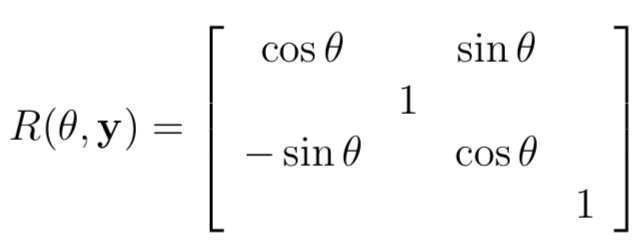


ROTATION AROUND AXIS

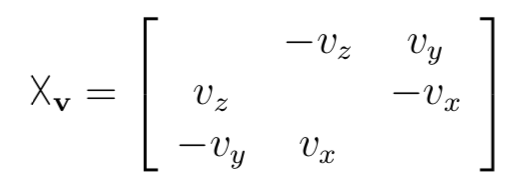


ABOUT X

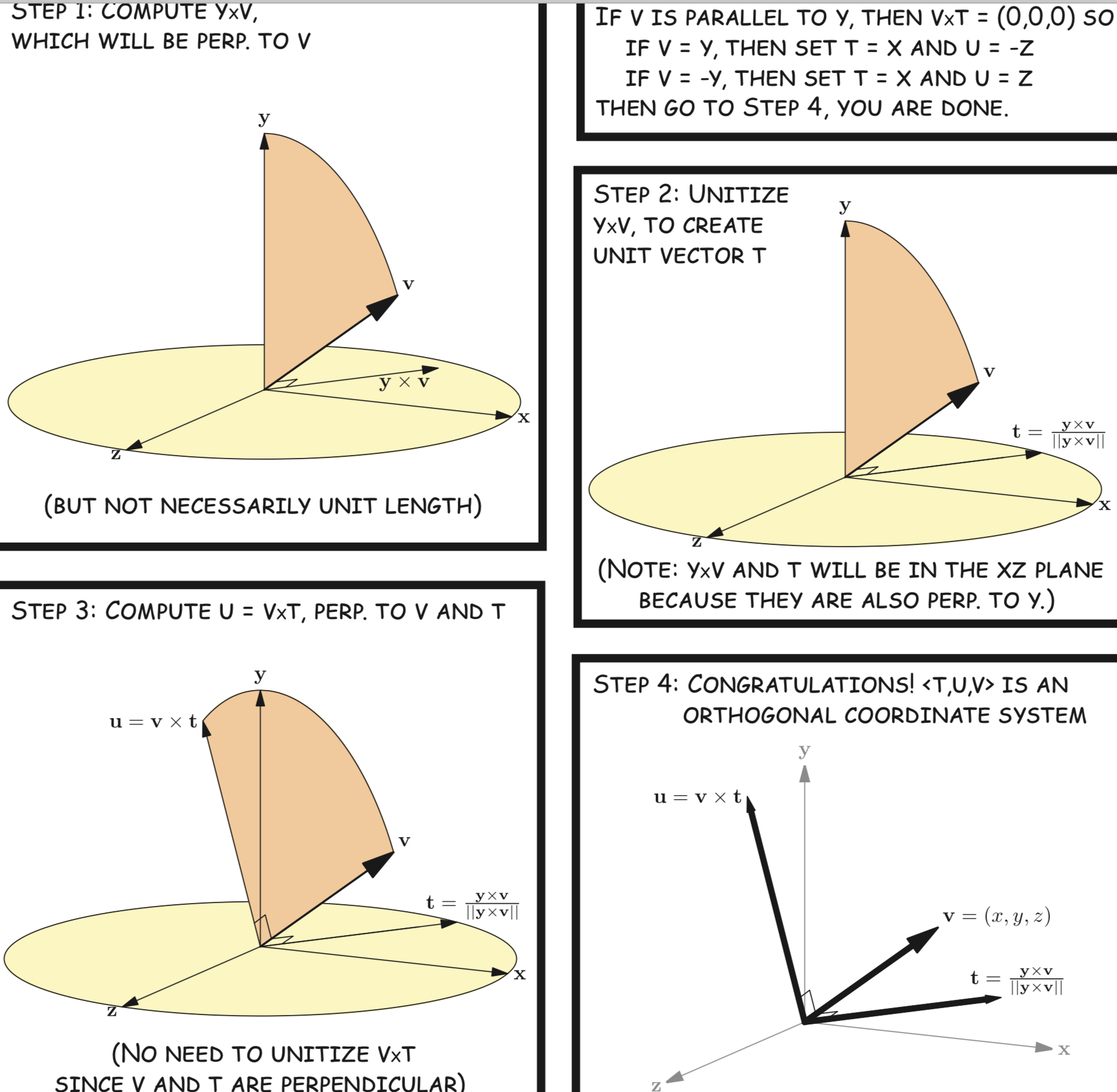
ABOUT Y



Cayley’s Formula



MAKE ORTHOGONAL COOR



ROTATION SUIYI AXIS