Whenever possible we want to use an orthonormal basis vector set when we transform our data.

↳ That is transformation matrix to be an orthogonal matrix.

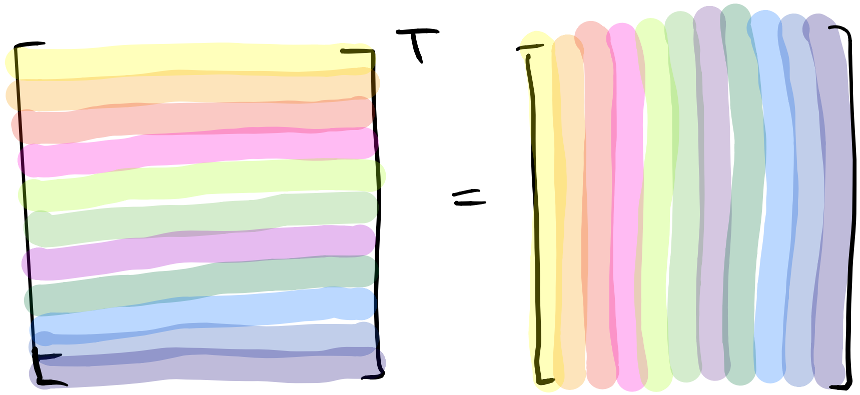
→ inverse is easy to compute.

→ transformation is reversible; it doesn't collapse space.

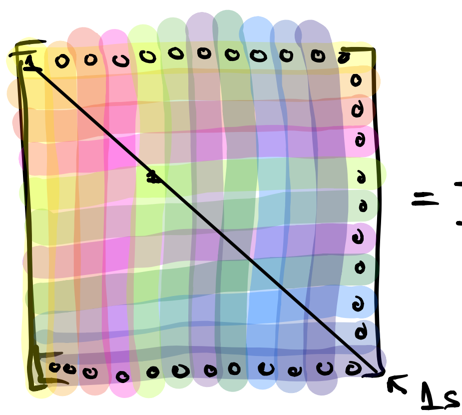
→ projection is just the dot product.

The transpose of a matrix is the interchange of columns for rows.

$$A_{ij}^T = A_{ji}$$



A^TA =



$= I.$

When all vectors are perpendicular called orthonormal.

$a_i \cdot a_j = 0, \; i \neq j$

$a_i \cdot a_j = 1, \; i = j$

$|A^TA| = \pm 1$. (if inversion).