Linear Algebra Formulas

Dot product of vectors

Dot product of vectors $$a \cdot b = \sum_{i=1}^{n} a_i b_i$$

Scalar and vector projection

Magnitude of a vector $$\|x\| = \sqrt{\sum_{i=1}^{n} x_i^2}$$

Vector projection of a vector a onto a vector b $$proj_b a = \frac{a \cdot b}{\|b\|^2} b$$

Inverse and determinant

Determinant for a two-dimensional matrix $$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$det(A) = a \cdot d - b \cdot c$$

Matrices changing basis

Inverse for a two-dimensional matrix $$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$A^{-1} = \frac{1}{det(A)}$$