
1 Essential Vocabulary

Adjugate of a matrix (the term **Adjoint** is also sometimes used) The transpose of the matrix of cofactors of a matrix - it is part of a formula for the inverse of a matrix.

Cofactor expansion A method to compute $\det A$ using determinants of minor matrices associated with one row or one column.

Cramer's rule A method of solving systems of equations that uses determinants.

Determinant A function that assigns a scalar output to each square matrix A , denoted $\det A$ - it is nonzero if and only if A is invertible. Geometrically speaking, the determinant of a linear transformation of a square matrix is the factor by which area (or volume or hypervolume) is scaled by the transformation.

Laplace Expansion Theorem The determinant of a matrix can be computed using cofactor expansion along ANY row or ANY column.

Properties of determinants

1. The determinant of a triangular matrix is the product of its diagonal entries.
 2. The determinant of a matrix is equal to the determinant of its transpose.
 3. The determinant of the inverse of a matrix is the reciprocal of the determinant of the matrix.
 4. A matrix with a zero row has determinant zero.
 5. Interchanging two rows of a matrix changes the sign of its determinant.
 6. A matrix with two identical rows has determinant zero.
 7. Multiplying a row of a matrix by k multiplies the determinant by a factor of k .
 8. Multiplying a matrix by k multiplies the determinant by a factor of k^n .
 9. Adding a multiple of one row of a matrix to another row does not change the determinant.
 10. A matrix is singular if and only if its determinant is zero.
 11. The determinant of a product is equal to the product of the determinants.
-