Accordingly $[\lambda_i, \delta_{ij}]$, $[\lambda\delta_{ij}]$ are diagonal and scalar matrices respectively.

For a square matrix A = $[a_{ij}]$, the symbols $\mid A \mid$, det A, det$[a_{ij}]$ are used to denote the determinant of A:

$$\mid A \mid = \mid a \mid_{ij} = \det \text{A} = \det[a_{ij}]$$

We note that if A is a non square matrix, $\mid A \mid$ is not defined.

1. Operations with real matrices

1.1. Equality. The matrices $[a_{ij}]$, $[b_{ij}]$ are equal if they are of the same size and corresponding elements are equal:

$$[a_{ij}]_{mxn} = [b_{ij}]_{mxn} \iff a_{ij} = b_{ij} \text{ for all i, j.}$$

1.2. Addition. The sum of two matrices $[a_{ij}]$, $[b_{ij}]$ of the same size is a matrix of the same size whose elements are the sums of their corresponding elements:

$$[a_{ij}]_{mxn} + [b_{ij}]_{mxn} = [a_{ij} + b_{ij}]_{mxn}$$

1.3. Multiplication by a scalar. The product of a matrix with a scalar is a matrix of the same size obtained by multiplying every element of the matrix by that scalar:

$$c[a_{ij}] = [\text{c } a_{ij}] = [a_{ij}]\text{c}$$

1.4. Subtraction. The difference A-B of two matrices A and B of the same size is the matrix A+ (- B):

$$[a_{ij}]_{mxn} \text{ - } [b_{ij}]_{mxn} = [a_{ij} \text{ - } b_{ij}]_{mxn}$$

1.5. Multiplication. The product AB is defined only when the number of columns in A is equal to the number of rows in B.