Vectors, Matrices

# Vectors

## Add and sub

## Const multiply

## Multiply (cross product)

same as matrix multiplication that cover later.

## Multiply (dot/scalar product)

# Matrix

## Add and Sub

have to be same size of matrices to addition or subtraction.

### Special

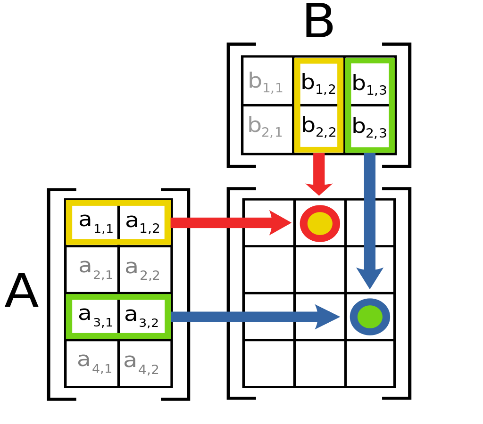
## Multiply

### Scalar

### Matrix

First matrix’s cols must be same as second matrix’s rows.

A képen tér, Téglalap, ablak, sor látható

Automatikusan generált leírás

Not commutative (generally):

If => A, B are interchangeable.

# Square matrices

Same count column and row.

associative:

these matrices can have ore or multiple special properties.

## Zero matrix

Every value is zero.

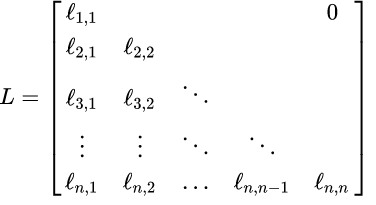
## Identity matrix

Main diagonal elements with value of one.

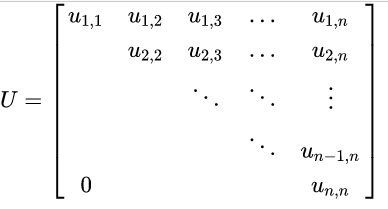
## Lower, Upper triangular matrix

In lower triangular matrix the main diagonal elements and below can be any values, other can be zero:

Lower triangular matrix example:



Upper triangular matrix example:



## Adjoint matrix

Swap rows and cols in matrix A (transpose)

Example:

### Self-adjoint matrix

Example:

## Inverse matrix

Matrix determinant must be non-zero.

If A matrix has got inverse, it called “regular” matrix.

If A matrix has no inverse, it called “singular” matrix.

## Orthogonal matrix

Orthogonal matrix if

# Determinant

## 2x2 matrix

## 3x3 matrix

if exist “regular”

if not exist “singular”

## NxN matrix

Same as 3x3 matrix but sub-determinants will be 3x3 or more matrices.

# Eigenvalues

https://matrixcalc.org/vectors.html

: square matrix

Characteristic equation:

## Example

### 2x2

I. Write characteristic equation:

### 3x3

I. Write characteristic equation:

II. Write determine:

III. Equation

IV. Eigenvalues: