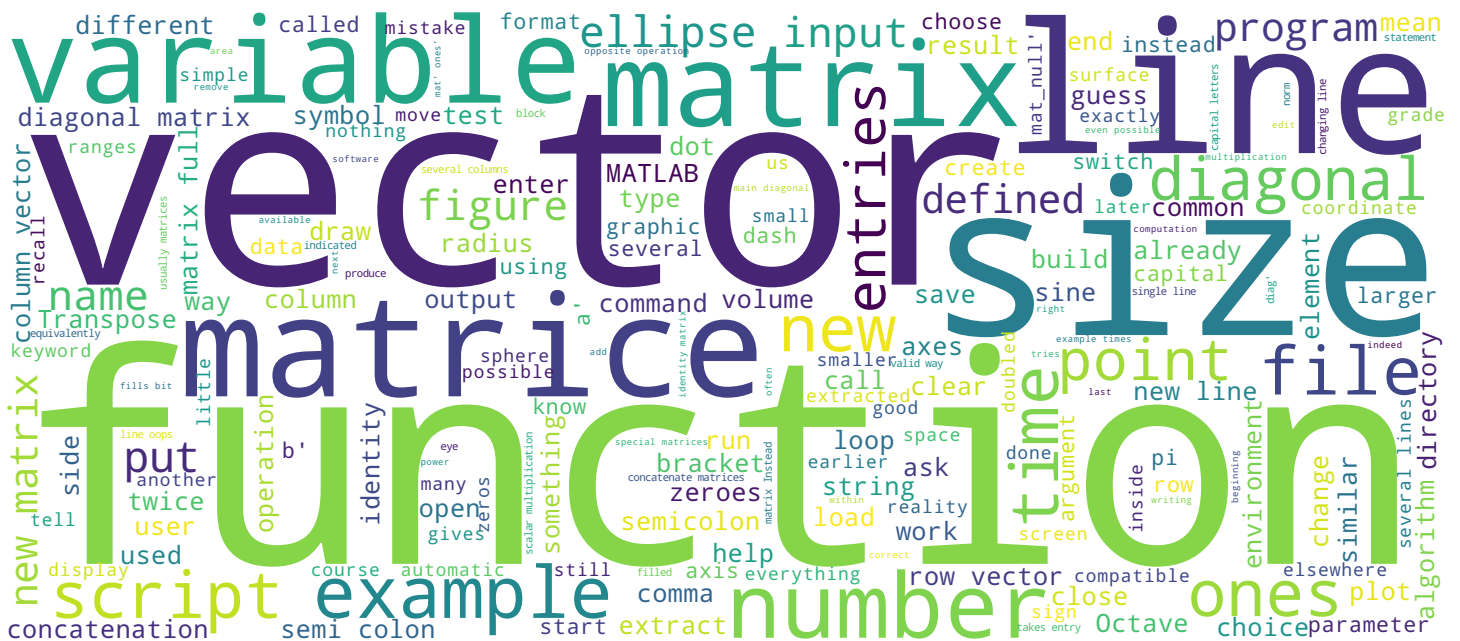


## 2.3 Matrix operations

# MATLAB and Octave for beginners

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# Basic matrix operations

Terminal Octave ou MATLAB

```
1.50000 3.00000 -0.30000

>> C = A - 2*B
C =

1.00000 -2.00000 -5.50000
0.00000 -2.00000 -1.50000

>> D = [A, B]
D =

Columns 1 through 5:

1.00000 2.00000 3.50000 0.00000 2.00000
3.00000 4.00000 -2.10000 1.50000 3.00000

Column 6:

4.50000
-0.30000

>> A+D
error: operator +: nonconformant arguments (op1
is 2x3, op2 is 2x6)
>>
```

Definition of matrices:

- Matrices by concatenation
- Sum : only for matrices of the same size
- Multiplication by a scalar

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We move on to matrices. So a matrix is a very similar to a vector, only that it has several lines and several columns. So, I would like to define a matrix with two rows. So again I clear all my environment and then I say capital A. so usually matrices are capital letters and then I say a first line equal to 1, 2, 3.5 and second line oops here, what I do it, I go to a new line. It's also valid way to say that I'm changing line. so it's 3, 4 minus 2.1 and then I close and then enter and my variable is defined as a matrix. Instead of new line I could also have used the semi colon. If I want to write all these on a single line so I take B equal to first line 0 to 4 and then second line so now with the semicolon 1.5 3 minus 0.3 and then close my brackets and I see my new matrix. So the two, have the same size and they can do a sum between them so C equal the sum of a minus 2 b so here I do at the same time a sum between matrices and a scalar multiplication and they get my new matrix of the same size. I can also concatenate 2 matrices so now I say D is a concatenation of A with B and since I put a comma, these are side by side okay, so my D is a 2 by 6 matrix. but now I cannot do the sum between these two matrices.

Notes

Summary



0m 04s

# Manipulation of matrices

Terminal Octave ou MATLAB

```
4      6
>> matrice(2,3)
ans = -2.1000
>> matrice(2:3,[4,6])
ans =

    1.5000    -0.3000
    0.0000     9.0000

>> A'
ans =

    1.0000    3.0000
    2.0000    4.0000
    3.5000   -2.1000

>> mat_null = zeros(3,4)
mat_null =

     0     0     0     0
     0     0     0     0
     0     0     0     0

>> mat_unes
```

- Concatenation
- Extraction
- Transpose

Special matrices :

- zeros, ones
- identity
- Diagonal matrices

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so for example A and D because their sizes are not compatible. Let's see now, how we can work with these A, B and D. So I take for example: a new matrix which is a concatenation of D and then semi colon and then I take twice D again. So first I will have the matrix D and below twice D and then the size of the 2 by 6 and the size of the new matrix it will be 4 by 6. So I doubled the lines, the number of lines so I can extract like I did for the vectors some entries of this matrix but now I have to give a 2 ranges. one for the columns and one for the lines. so it takes entry 2, 3 and so this is minus 2 that 1. I can also take the entries from 2 to 3 comma 4 and 6 and then I get this 2 by 2 matrix which is extracted from that matrix matrix. so if I could take A, that we use earlier and I Transpose it with a same symbol as before I get a 3 by 2 matrix okay, so the Transpose is this dash. There are also special matrices for example: a matrices, matrix which is only zeros. so, can define 'mat\_null' as zeroes, and then I have to give the size before I give 4.1 or 1.4 for a vector and now I can give a a matrix sizes, which is for example 3 times 4, a 3 by 4 matrix full of zeroes and equivalently there is a matrix with which is filled with ones and the common is ones.

Notes

Summary



2m 06s

# Manipulation of matrices

```
Terminal Octave ou MATLAB
Diagonal Matrix

    1    0    0    0
    0    2    0    0
    0    0    3    0
    0    0    0    4

>> A
A =

    1.00000    2.00000    3.50000
    3.00000    4.00000   -2.10000

>> u = diag(A)
u =

     1
     4

>> u = diag(A) '
u =

     1     4

>>
```

- Concatenation
- Extraction
- Transpose

Special matrices :

- zeros, ones
- identity
- Diagonal matrices

MATLAB and Octave for beginners

and I define 'mat' 'ones' equal to ones 3,4 and I get my 3 by 4 matrix full of ones. I can also build the identity. The identity is a is a Diagonal matrix with ones on the diagonal and zero elsewhere. So here eye 3 3 3 is the size so is is the identity matrix 3 by 3. In reality what this function does is to produce a vector of the size, which is indicated in the arguments and then fills bit with ones in the diagonal. So it is even possible to define a diagonal matrix from a given vector. So I take v equal to 1, 2, 3, 4 so this is a a vector, line vector and then I define a new matrix which has as diagonal this four entries. So with this line vector I define a diagonal matrix equal to 'diag' of v so the size will be automatic and I see this diagonal matrix with 1, 2, 3, 4 on the diagonal. I can also do the opposite operation. I have a matrix A So recall what it is and now I can extract the main diagonal. Here it would be 1 and 4 so I define vector u equal to the diagonal of A and I get the vector 1, 4 as a column vector. If I want a row vector at this point I have to Transpose the diagonal or A.

Notes

Summary



4m 20s