

Basic vector operations

Terminal Octave ou MATLAB

```
2
4
5

>> vec_ligne = [-2, 3, 4]
vec_ligne =

    -2     3     4

>> v = vec_ligne
v =

    -2     3     4

>> size(v)
ans =

     1     3

>> size(vec_col)
ans =

     3     1

>>
```

Definition of vectors:

- Row and column vectors by concatenation
- Copy of vectors
- Equidistributed vectors

MATLAB and Octave for beginners

We now see how to work with vectors and matrices. First we will see that sum and multiplication are defined as in mathematics. In addition it is also possible to do operations element by element. We first consider basic vector operation. you can define vectors for example: column vectors so `vec_col` equal and then I have to use a brackets as we seen before and we separate each entry by a semicolon. and then I hit enter and I see my column vector. I can also do a row vector but the syntax is very similar I type '`vec`' ligne, which in french means 'row' equal to brackets and now instead of semicolon, I have to use space or this is new a comma. to the two things are exactly the same. so minus 2 comma, 3 comma, 4, I close the brackets and then have my row vector. I can define '`v`' as a my vector row. so I can redefine I can define a new variable and then have a look at the size of this variables so I think type `size 'v'` then I get one three, so it's a 1 by 3 matrix or a row vector. and If I have a look at the size of a my row vector then it is 3 by 1. perhaps so you have a three lines and one column.

Notes

Summary



Basic vector operations

Terminal Octave ou MATLAB

```
Column 6:
      4
>> b = [-0.5:2:3]
b =
   -0.50000   1.50000
>> b = [-0.5:2:5]
b =
   -0.50000   1.50000   3.50000
>> b = [-0.5:2:3.5]
b =
   -0.50000   1.50000   3.50000
>> c = linspace(2.1,4.2,4)
c =
   2.10000   2.80000   3.50000   4.20000
>>
```

Definition of vectors:

- Row and column vectors by concatenation
- Copy of vectors
- Equidistributed vectors

MATLAB and Octave for beginners

I can also define a variable 'a' as being a vector between 1 and 4 but with all the entries in between so minus 1 4 gives me minus 1 0 1 2 3 4 so this is a shortcut to actually define a vector with a 6 entries. I can also define vector b which is a similarly defined but the spaces which are not 1 but 2 here. so I define the vector b as a minus 0.5 by 2 until 3 and then have minus 0.5 and 1.5 and then stops because the next one would be 3.5 so if I can, if I change these and arrive at up-to 5 then it stops at 3.5 Why because 5 is the upper limit. It is not the last number. it is not always reached. If I write that 'b' is a minus 5 by 2 until 3.5, I get exactly to the same number. Each time here we have defined the variable 'b'. so it's always a new one. so, every time I do equal the last variable 'b' is crushed in the new one and the new variable stays there. There is also another way to define Equidistributed vectors for example: by defining 'c' equal Lin space so this is a an a built in function. and I have to give the beginning, the end and then the number of elements that I want. so this will define a vector which is exactly 1 by x 4 which goes from to that 1 to further 2. with Equidistributed numbers.

Notes

Summary



1m 50s

Manipulation of vectors

Terminal Octave ou MATLAB

```
>> clear all
>> a = [-1:2:5];
>> b = [0.5:1.4:6];
>> c = [a, b]
c =

Columns 1 through 5:

-1.00000  1.00000  3.00000  5.00000  0.50000

Columns 6 through 8:

1.90000  3.30000  4.70000

>> c(3)
ans = 3
>> x = c([2,4,5,1])
x =

1.00000  5.00000  0.50000 -1.00000

>>
```

- Concatenation
- Extraction
- Transpose

MATLAB and Octave for beginners

On now we will see how to manipulate vectors. First I clear my environment with clear all okay, so this will remove all my variable and they can define a new one 'a' which is equal to minus 1 upto 5 with increase of 2 so this is minus 1 colon 2, colon 5 and at the end, I put a semicolon so that I don't see what is actually done but I know this is a equal space vector 'a'. Then I define a second vector 'b' which goes from 0, 5 by steps of 1.4 up-to 6. so same notation and I don't want to see. The results, so I put the semi colon at the end. Now I would like to form one single vector with 'a' and 'b' together. How can I do that well I say c, I use the brackets as before and instead of writing numbers, I have write the variables that they want to Concatenate. so this is Concatenating variables and since I put a comma between them then these variables will be put the two row vectors give us a row vector with one line. Now I can also extract their use from this new variable 'c'. So I can take 'c' 3 and it gives me the third element of this vector. I can even have a new vector 'x' which is equal to some of the entries of 'c' for example I want to take the second, the fourth and the fifth entries of 'c' So this is how I can extract those entries and I have my new vector 'x' which is a subset of the vector 'c'.

Notes

Summary



3m 48s

Manipulation of vectors

Terminal Octave ou MATLAB

```
Columns 1 through 5:
-1.00000  1.00000  3.00000  5.00000  0.50000

Columns 6 through 8:
 1.90000  3.30000  4.70000

>> c(3)
ans = 3
>> x = c([2,4,5,1])
x =
 1.00000  5.00000  0.50000 -1.00000

>> x'
ans =
 1.00000
 5.00000
 0.50000
-1.00000

>> █
```

- Concatenation
- Extraction
- Transpose

MATLAB and Octave for beginners

so I have these entries which are the four entries of 'c' that I have extracted. I can also Transpose a row vector and then obtain a column vector. Of course if you Transpose a column then you get a row and if you Transpose a row, you get a column so the symbol is the this a dash, so it's dash. It gives me the Transpose of 'x' which is a column vector It's exactly the same entries as before. So this symbol is not the derivative symbol is the Transpose symbol in Octave.

Notes

Summary



5m 58s

Manipulation of vectors

Terminal Octave ou MATLAB

```
>> clear all
>> a=[-3;2;1];
>> b=[0.5;2;-4];
>> c = a+b
c =

-2.5000
 4.0000
-3.0000

>> d = 3.2 * a
d =

-9.6000
 6.4000
 3.2000

>> vec_long = [a;b];
>> a+vec_long
error: operator +: nonconformant arguments (op1
is 3x1, op2 is 6x1)
>>
```

- Sum : only of vectors of the same size
- Multiplication by a scalar

Special vectors

- Null vector
- Vector of ones

MATLAB and Octave for beginners

Let's see now how to do sums and scalar multiplications. I clear again my environment and then I define two vectors 'a' as a column vectors with three entries so I have to use semi colons So I have minus 3 to 1 in colon and I put a semicolon and then 'b' is a second vector have the same size. I define them in the same size because I'm going to work with a 'a' and 'b' together. for example to the sum I have to be the same size, other wise it's illegal to do our sum. okay, now I can do $c = a + b$ and I get a vector which has the same size as 'a' and 'b' of which entries are the sum of the entries of 'a' and 'b' I can also multiply by a scalar so if I say 'b' is equal to 3.2 times 'a' then I get the each entry of 'a' is multiply by 3.2 and I say get a vector of the same size of 'a' so it's a column vector with three entries. So as I said before If you want to do the sum of vector, the sizes have to be the same. If I have vector that is too long For example I take a long vector which is equal to the concatenation of 'a' and 'b' So I have taken 'a' and 'b' concatenated by semicolon so I get a big column and I try to do a plus this vector long then there is a mistake, there is an error and Octave tells you you cannot sum these vectors.

Notes

Summary



6m 42s

Manipulation of vectors

Terminal Octave ou MATLAB

```
>> d = 3.2 * a
d =

   -9.6000
    6.4000
    3.2000

>> vec_long = [a;b];
>> a+vec_long
error: operator +: nonconformant arguments (op1
is 3x1, op2 is 6x1)
>> vec_null = zeros(4,1)
vec_null =

     0
     0
     0
     0

>> vec_uns = ones(1,4)
vec_uns =

     1     1     1     1

>>
```

- Sum : only of vectors of the same size
- Multiplication by a scalar

Special vectors

- Null vector
- Vector of ones

MATLAB and Octave for beginners

There is a particular vector Which is the zero vector okay so you say 'vec null' equal to zeroes then I have to tell the size so I say size for comma 1 What does it mean? It creates a 4.1, so a column vector with 4 entries and all are known are zero. I can also define a vector of 1 this time I have I would like a row vector, so is a ones 1, 4 again and here the sizes 1.4 is a row vector with 4 entries and all equal to 1.

Notes

Summary



8m 45s