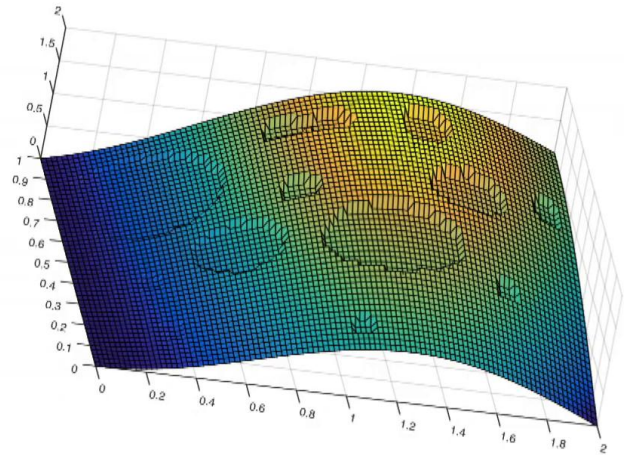
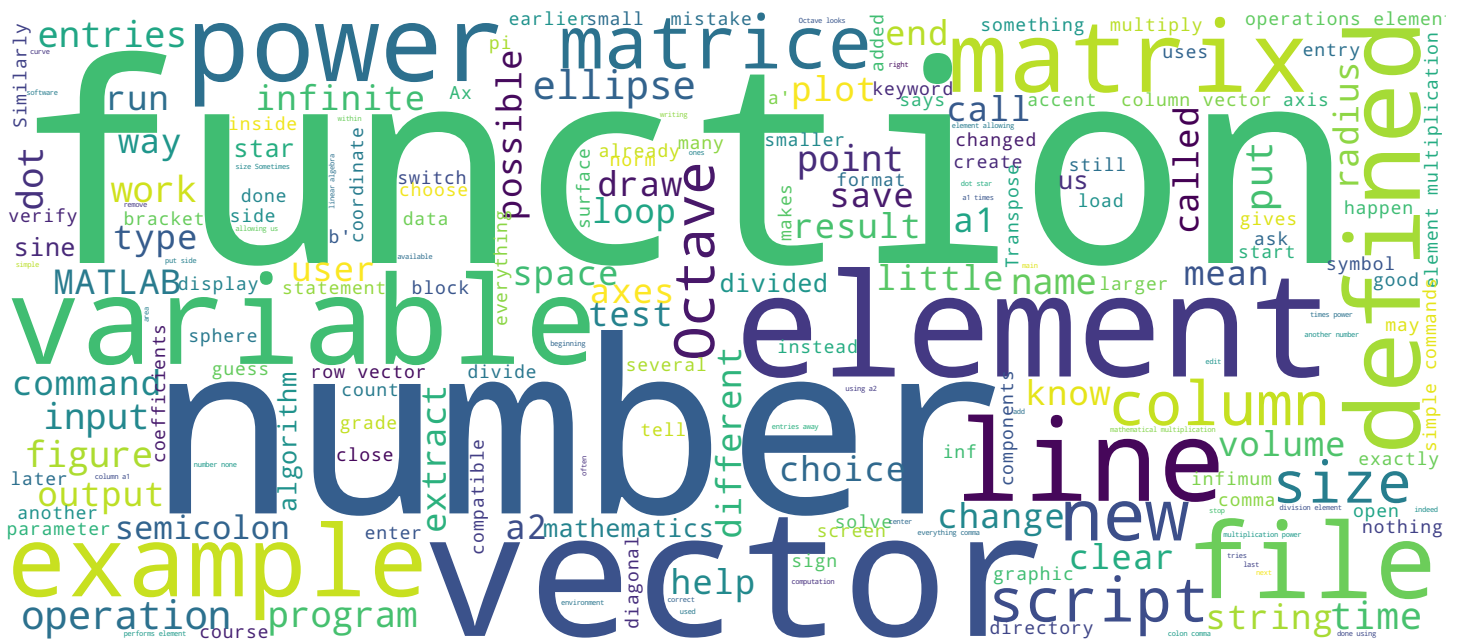


MER Simone Deparis



MATLAB and Octave for beginners



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Video



EPFL

Element by element operations

Terminal Octave ou MATLAB

```
>> a1+a2
ans =

     5
     1
     0

>> a1*a2
error: operator *: nonconformant arguments (op1
is 3x1, op2 is 3x1)
>> a1.*a2
ans =

     6
     0
     0

>> [a1 a2 a1.*a2]
ans =

     2     3     6
     1     0     0
     0     0     0

>>
```

What does $A+2$ mean?

Element by element operations:

- Multiplication
- Power
- Division

MATLAB and Octave for beginners

Sometimes, we want to make operations element by element. That is not to do a mathematical multiplication of matrices or vectors but only to work with components. These have called a element by element operations. Let us look at the A that we define earlier. What does it mean to A plus some number so a matrix plus a number in mathematics is not defined but in Octave this actually does each entries away plus 2. so all coefficients of A were changed and added by 2 Now we can extract the first column of a $a1$ is the first column of A so I can take the semicolon to say that I take everything comma 1. So I take all the entries of the first column. This is how I get the first column A . I can get the second column of a , they extract by a colon comma 2 and I get it. and they can do the sum of these two column vectors. I can also do a element by element multiplication between these two but is it that's not just with a star. We need to put a dot before the star. so if we do dot star then Octave looks if the vectors have the same size and then it performs element by element multiplication. So if you put side by side all these entries we can verify that in the first line we have 2 by 3 equal to 6 second line 1 and 0 equal to 0 and then 0 than 0 equal to 0.

Notes

Summary



Element by element operations

Terminal Octave ou MATLAB

```
1
0

>> a1.^a2
ans =

    8
    1
    1

>> a1 ./ a2
ans =

    0.66667
    Inf
    NaN

>> [a1 a2 a1./a2]
ans =

    2.00000    3.00000    0.66667
    1.00000    0.00000         Inf
    0.00000    0.00000         NaN

>>
```

What does $A+2$ mean?

Element by element operations:

- Multiplication
- Power
- Division

MATLAB and Octave for beginners

Similarly, we may want to make the power of a number. First have a look of what happens if you want to do 2 to the power of 3, so we do 2 to the power of 3 and we get 8 so there is this little hat. can I do the same thing but with all the elements of a so for example: I take just the column a1 so I do a1 times power of to the 3 and the each entry of a 1 is done to the power of 3. I can also do an operation, where the power is done using a2. okay so I do dot hat and then I write a2 So here I have a little problem with my keyword when I do a hat so it uses the accent so I have to do hat and then space so that this is hat is really there. so hat space so then I count it a and then do 2 so this makes an element by element power. so the first element of a1 is to the power of the first element of a2 and so on. In the same way, I can also do division element by element. Here I see that there is an inf and infinite and also at not number. okay because I divided with some numbers which are 0 or I did 0 over 0. and that's why I have infinite or another number as a result. In mathematics, it is not defined. We cannot divide a number by 0. So MATLAB or Octave replace it with infimum with infinite. If we have 0 by divided by 0 it is not defined at all and then it says not number none.

Notes

Summary



2m 06s

2.2-2.5 Vector and matrix operation



you know now, how to work with vectors and matrices. The operations are defined as a linear algebra. It is possible to multiply a matrix by a vector or two matrices, if sizes are compatible. It is also possible to solve a problem $Ax = b$, simple commands. It is also possible to do operations element by element allowing us to do operations like multiplication power between vectors or matrices of the same size.

Notes

Summary



4m 14s