

MATLAB, Lab 2 – Individual work

Perform the following operations using MATLAB in interactive mode. Fill in the gaps and send the report back.

1. Refer to the operation of the **format** command (type **help format** at the prompt of Command Window), and then test it experimentally by introducing a variable $a = 24/18$ and observe how MATLAB displays this variable in the:

- short format,
- long,
- rat (ratio of small integers).

How will the **format rat** phrase display the expression: $20+90 / 8$? Check your answer.

Notice what happens in the session when you enter the command **format compact**.

Answer: $a=24/18$ format short = 1.3333 format long= 1.3333333333333333 format rat = 4/3
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$20+90/18$ --> format rat = 25 format compact = 25
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2. Create vector of all odd integers contained between numbers 31 and 45.

Code: $a = [31:2:45]$

3. Write such a script and explain what happens

$Y='hat'$

$X=Y+0$

Answer: [104 97 116]

4. Use MATLAB to find the **sum** total of the vector coordinates from the task nr 2.

Code: $\text{sum}(a)$

5. Define the vector $x = [2 \ 5 \ 1 \ 6]$, and then perform the following actions without using loops

- Add 16 to each element
- Add 3 to the elements with odd indices
- Find the square root of each element
- Find the square (power of 2) of each element

Code: $Q_1 = x+16;$ $Q_2 = x(1:2:\text{end}) + 3;$ $Q_3 = \text{sqrt}(x);$ $Q_4 = \text{power}(x,2);$

6. Using "the most cost-effective" commands create a vector:

- $y = [2, 4, 6, 8, \dots, 20]$

- $z = [10, 8, 6, 4, 2, 0, -2, -4]$
- $v = [1, 1/2, 1/3, 1/4, 1/5, 1/6]$
- $w = [0, 1/2, 2/3, 3/4, 4/5]$

Code: `y = [2:2:20] ; z = [10:-2:-4] ;`

7. Create a vector composed of the numbers in the form

$$x_n = (-1)^{n+1}/(2n-1)$$

for n from 1 to 100, and then find the sum of all such numbers.

Code:

`nodd=[1:4:197] % when n is odd`

`neven=[-3:-4:-199] % when n is even`

this 2 array is in same size so if we sum this two we will find an array which has a 50 elements and all of them equal to -2.

`sum(nodd+neven)`

`ans = -100`

8. Check experimentally, what happens when we try to find the matrix inverse to the identity matrix.

Answer: identity matrix again

9. Using the matrix operations, find the solution of the following equations

$$2x + 3y + z = 1,$$

$$x - 2y + 7z = 17$$

$$3x + 4y + 10z = 19$$

Code: `A = [2 3 1 ; 1 -2 7 ; 3 4 10] ; b=[1;17;19]; X = [x;y;z]; X = inv(A)*b`