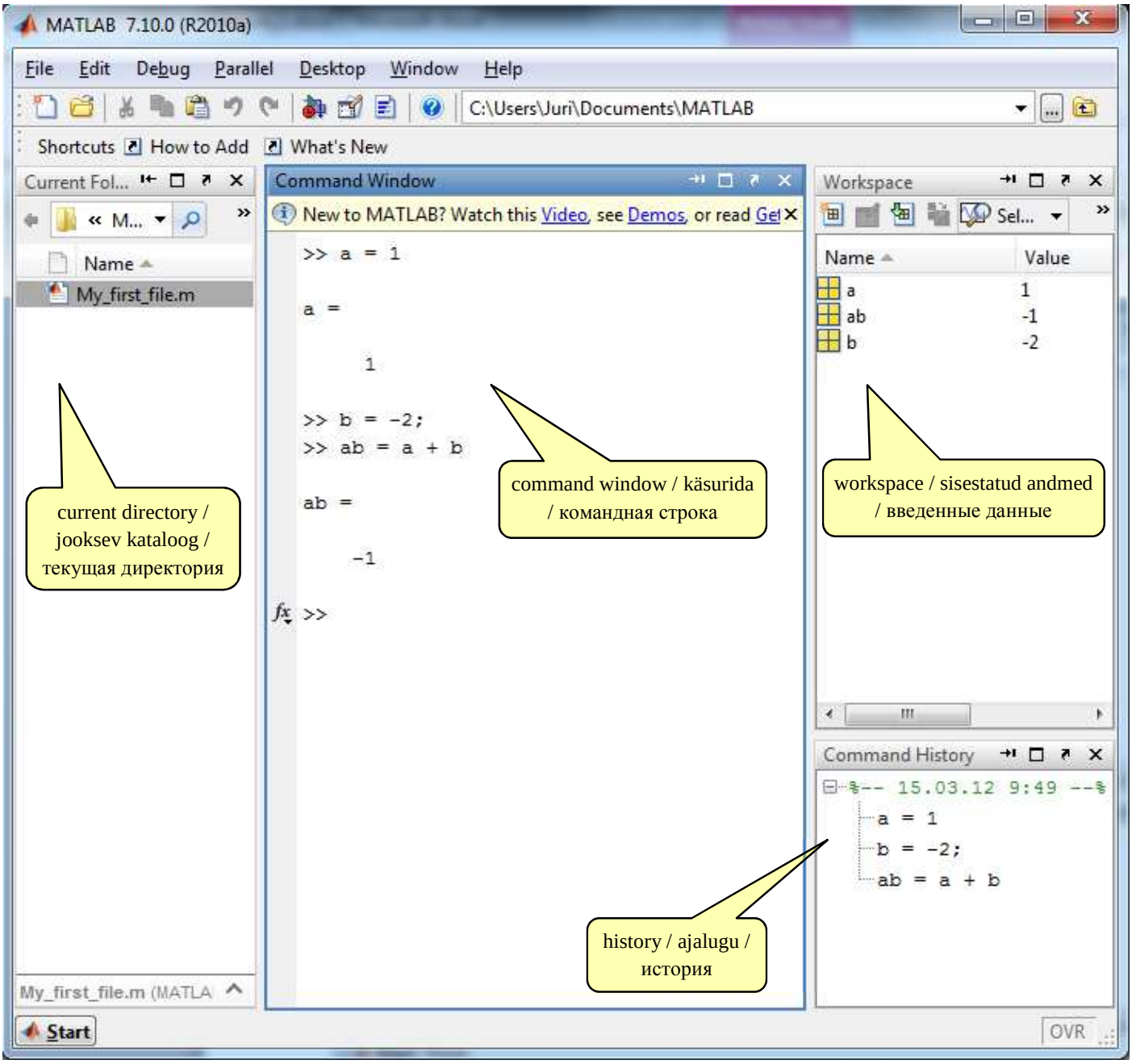
First steps in MATLAB

1. Introduction / Sissejuhatus / Введение
2. MATLAB: interface



NB: Desktop – Command Window, Command History, Current Folder, Workspace, etc.

NB2: Help – Product Help OR **help** *command_name* (in command window).

3. Command window / Käsurida / Командная строка

Basic commands / Põhikäsud / Основные команды

```
>> a = 1 % some comment
a =

     1

>> b = -2; % the semicolon symbol (;)

>> b^2 % ^ - power; ENG: Shift + 6; EST: AltGr + Ä
ans =

     4

>> ab = a + b % sum of a and b
ab =

     -1

>> 1 + 2*sqrt(ab) % sqrt - square root
ans =

   1.0000 + 2.0000i

>> log(0) % Inf = infinity
ans =

  -Inf

>> var1 = 3.1415e+3 % 3.1415e+3 is the same as 3.1415*10^3
var1 =

  3.1415e+003

clear all % removes all objects from the workspace
```

Vectors and matrices / Vektorid ja maatriksid / Вектора и матрицы

```
>> a = [1 2 3 4 3 2 1]   % row vector
a =

     1     2     3     4     3     2     1

>> b = a + 3   % element wise addition
b =

     4     5     6     7     6     5     4
```

```
>> A = [9 2 3; -1 3 4; 0 2 1]   % the semicolon symbol (;) separates rows of the matrix
A =

     9     2     3
    -1     3     4
     0     2     1

>> At = A'   % the apostrophe symbol (') denotes the transpose of the matrix
At =

     9    -1     0
     2     3     2
     3     4     1

>> B = A*At   % the symbol (*) denotes multiplication of matrices
B =

    94     9     7
     9    26    10
     7    10     5

>> A   % displays the content of the variable
A =

     9     2     3
    -1     3     4
     0     2     1

>> A(1,1) + A(2,3)   % A(i,j) - ith row and jth column
ans =

    13

>> A(3,3) = 4   % replacement
A =

     9     2     3
    -1     3     4
     0     2     4

>> row1 = 2:5   % create the array with step equals to 1
row1 =

     2     3     4     5

>> row2 = 6:-0.5:3.5   % create the array with step equals to 0.5
row2 =

    6.0000    5.5000    5.0000    4.5000    4.0000    3.5000

>> A(2:3,1:2)   % from 2nd to 3rd row; from 1st to 2nd column
ans =

    -1     3
     0     2
```

```
>> inv(A)   % returns the inverse of the square matrix A
ans =

    0.1053   -0.0526   -0.0263
    0.1053    0.9474   -1.0263
   -0.0526   -0.4737    0.7632

>> diag(A)   % returns the main diagonal of A
ans =

     9
     3
     4

>> eig(A)   % returns a vector of the eigenvalues of matrix A
ans =

   0.6426
   7.6787 + 0.4106i
   7.6787 - 0.4106i

>> p1 = poly(A)   % returns characteristic polynomial of the matrix A
p1 =

    1.0000  -16.0000   69.0000  -38.0000

>> roots(p1) % returns a column vector whose elements are the roots of the polynomial p1
ans =

   7.6787 + 0.4106i
   7.6787 - 0.4106i
   0.6426

>> p2 = [1 2 -3 5];   % row vector contains the coefficients of a polynomial, ordered in
descending powers, i.e. p2 = x^3 + 2x^2 – 3x + 5

>> conv(p1,p2)   % polynomial multiplication
ans =

  1.0e+003 *

  Columns 1 through 7

    0.0010   -0.0210    0.1420   -0.2300   -0.9790    3.5750   -3.6280

  Column 8

    1.1400
```