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

```matlab
>> 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

```matlab
>> 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