

## Lab. 1 Introduction to MATLAB / Octave

Do the exercises below should be done in the Octave IDE. You should only use assignments operations with arithmetic expressions including pre-defined MATLAB functions. Also use scripts to avoid “too much typing”.

### 1. Solve a 1<sup>st</sup> degree equation

Type in two numbers  $a_0$  and  $a_1$  solve equation  $a_1x + a_0 = 0$ .

### 2. Solve a 2nd degree equation

Type in three numbers  $a_0$ ,  $a_1$  and  $a_2$ , solve equation  $a_2x^2 + a_1x + a_0 = 0$ .

Note: Try cases with complex solutions.

### 3. Maximum of n numbers

Type in n numbers  $x_1, x_2, \dots, x_n$  and obtain the maximum of them.

**Note:** Use a vector and the adequate predefined function.

### 4. System of Linear Equations of n numbers

Type in numbers  $a_{i,j}$  and  $b_i$  (where  $i$  in  $1..m$ ,  $j$  in  $1..n$ , and  $m, n > 1$ ) and solve the corresponding system of linear equations.

**Note:** Use predefined matrix operations.

### 5. Length of a vector

Type in numbers  $a_i$  (where  $i$  in  $1..m$ , and  $m > 1$ ) and find the length of the n-dimensional vector  $a_i x_i$ .

**Note:** Use predefined vector operations.

### 6. Angle between 2 vectors

Type in numbers  $a_i$  and  $b_i$  (where  $i$  in  $1..m$ , and  $m > 1$ ) and find the angle between the n-dimensional vectors  $a_i x_i$  and  $b_i x_i$ .

**Note:** Use predefined vector operations.

### 7. Angle between 2 planes

Type in numbers  $a_i$  and  $b_i$  (where  $i$  in  $0..3$ ) and find the angle between the planes A and B (defined by  $\sum a_i x_i = a_0$ ).

### 8. Power of a Matrix

Type in numbers  $a_{i,j}$  (where  $i$  in  $1..m$ ,  $j$  in  $1..n$ , and  $m, n > 1$ ) defining matrix A and obtain the matrix B whose members are the power k of the corresponding members of A.

### 9. Power of a Matrix

Type in non-negative integers numbers  $a_i$  (where  $i$  in  $1..m$ , and  $m > 1$ ) and find how many of these are in the interval  $p..q$  (where  $p$  and  $q$  are also integers)