

Introduction to MATLAB

Tuesday, October 13th, 2015

Exercises for individual work (1)

1. Plot the following expressions:

a. $\sin(2x) + \cos(x)$, $0 \leq x \leq 2\pi$;

b. $x^4 + 3x^3 - 4x^2 - x + 1$, $-1 \leq x \leq 2$.

2. Write in an *m*-file a program for the scalar product *c* of two vectors *a*, *b* of the same size. Use *for* loops. Compare the performance of your implementation with the one available in MATLAB.

3. Write a MATLAB program for computing the matrix-vector product. Use *for* loops. Compare the performance of your implementation with the one available in MATLAB.

4. Implement the bisection algorithm for approximating the zero values of the following expression:

$$y = x \cdot x - 3 \cdot x + 1/3, \text{ for } 0 \leq x \leq 1.$$

5. Using the bisection algorithm, write a function that computes approximations of all real solutions of a given function *f*, in a given interval *I*.

a. $\sin(2x) + \cos(x) = 0$;

b. $x^4 + 3x^3 - 4x^2 - x + 1 = 0$.

6. Write a MATLAB program to calculate the value of a polynomial using the Horner scheme.

Note:

For solving the exercises, you are encouraged to use your notes, the tutorial materials, and especially the MATLAB help. Some of the keywords useful for the exercises are: variable, expression, sequence, vector, plot, for, if.