Intro to Matlab: Assignment #1

Due on 30.11.2014

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Put the following exercises in one script called main.m . Each exercise should be in a separate cell with the number of the exercise as a comment. Start the script with your name and the date (as comments). You should send all the files (main script and all the functions created) as a zip file (or similar) to the email dario.cuevas_rivera@tu-dresden.de. The project is due on 30.11.2014.

Problem 1

(a)

Create a multidimensional array called Arr1 which is $3 \times 4 \times 5$. The elements of this array must be all 1s on

the outer shell and 0s on the inside.

Create a second $3 \times 4 \times 5$ array Arr2 which is the opposite of Arr1: 0s on the outer shell and 1s on the inside.

You can find these two arrays on the website as .mat files, in case it is unclear what they should look like.

(b)

Create two cell arrays, Cell1 and Cell2, with three elements each. Cell1's elements should be, in this order: 23, 'A string', Arr1. The elements of Cell2: -51, 'another string', Arr2.

(c)

Create (and run) a function called SumCells with Cell1 and Cell2 as inputs. The output of the function should be a cell, CellSum, with elements that are the sum of the elements of Cell1 and Cell2. That is, each element of Cell1 should be added with the corresponding element of Cell2 and set as the corresponding element of CellSum. In the case of the strings, they should be put together separated by comas, that is, the result should be 'A string, another string'. This function should work with any two cells as input, as long as these cells have the right elements.

Problem 2

Create (and run in the main script) a function for each of the following functions:

(a)

Create a function Sinh(x,N) whose inputs are a real number (x) and an integer bigger than zero (N). The output of the function is calculated as:

$$output = x + \frac{x^3}{3!} + \frac{x^5}{5!} + ...$$

The sum should have N terms.

(b)

Create a similar function ExpN(x,N) with:

$$output = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ...$$

(c)

Create a similar function SinN(x,N) with:

$$output = 1 - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + ...$$

Hint: You can find a fully-commented implementation of sinN(x) and cosN(x) as a script on the website.

Problem 3

Assume there is a group of three people whose weights are 60kg, 75kg and 350kg. Create a vector VecW whose elements are these weights. Create a matrix MatA such that VecR = MatA*VecW contains 4 elements. The first element should be the 135 (60+75), the second 410 (60+350), the third 425 (75+350) and the last 485 (60+75+350).

Hint: Let the first row of MatA be [1,1,0]. You can see the lecture slides about matrix multiplication to fill the rest.