# Homework 2

## 2-AIN-150, Winter 2018

## Deadline: 29.10.2018, 23:59, boza@fmph.uniba.sk, mail subject: Machine learning HW 2

Before you start solving the homework, please read the general instruction at the end of the document. Submitted solutions should be your own. Do not copy and do not tried to find solution in literature or over the internet.

### Exponential model

Linear relations is not only possible relationship between variables. Consider simple example with one input $x$ and one output $y$. We assume, there is a following relationship:

$$y = Ae^{-x/B}$$

i. e. we have set of hyphotheses:

$$H = \{h(x) = Ae^{-x/B}\}$$

where $A, B$ are model parameters.

Your task is for given trainign data (pairs $x, y$) find model parameters, which fit your data in the best possible way. It is up to you to choose the error function and optimization method. Please provide short commentary about your method in submitted source code.

There are multiple test input in the package in names in form `test-A-B.txt`, where $A$ and $B$ are approximate values of parameters, you should find.

Your program can use any libraries for basic math, matrix operation, matrix inversion, solving systems of linear equations, and calcualating numerical or symbolic derivatives. You are forbidden to use methods, which calcuate linear regression, or other model.

**Python instructions** There is `template.py` in package. You should fill out the function `fit(X, y)`. Program can be runned using `python template.py <input file>`.

**Instructions for other languages** Input files contain multiple lines and on each line one pair $x, y$. Please provide clean output from your program.

## General instructions

You should submit homework via email with subject listed in title. Add your code to the email attachement.

Ideally submit your homeworks in Python (fill out required functionality from assignment). You can use different language if you really want, but you need also to add auxiliary functionality like reading input and output. But your solution should be runnable under Linux using open source software.