

## Homework No.5 for Extreme Value Statistics

Deadline Nov. 8th, 12AM.

(1) 100 pt.

Repeat the study of the daily meteorological data from the Boston area given in the Excel file of Homework No.4 ([http://cgl.elte.hu/~racz/EVS-hf04\\_Boston.csv](http://cgl.elte.hu/~racz/EVS-hf04_Boston.csv)). The relevant daily maximum and minimum temperatures are in columns C and D. When analysing this data from extreme value statistics point of view, you should notice the obvious yearly periodicity in the temperatures. Thus you should build the histogram of the maximal or minimal temperatures by restricting the time intervals from which the extrema are selected to the same period in every year (e.g. the same week or the same month). In this way, not only the problem of periodicity is eliminated but one may hope that the assumption of i.i.d. variables may also be correct.

(i) Select at least one summer and one winter period for building the distribution function of both the maximum and minimum temperatures. Fit the results to i.i.d. extreme value statistics and compare the results obtained for various seasons.

(ii) Studies of several periods (e.g. building the histograms of extremes related to each month) would be highly desirable.

(iii) Calculate the average of the maximal and minimal temperatures for every month of each year and find if there is a signature of global warming in these averages.

(2) 50 pt.

Study the statistics of the gap between the extreme and second extreme temperatures in the above problem No.(1).