**Suggested protocol for manual editing of extracted incubation behaviour**

Here is described process enabling to proceed manual edits to the extraction of incubation behaviour, made by the procedures described in the previous protocol and working within the script “HMM\_unip\_incub.R“ (in the Jose’s folder is called “manual\_postprocessing\_adjust\_NEW“) . Script requires tools provided in the updated script “tools.R“. Strong advice is to work with two desktops, with external (as big as possible) monitor allocated for the visualizations.

Input for the manual editing is the dataset resulting from the HMM and “postprocessing“ procedures, that is that dataset including the “hmm\_comb“ variable, which is now manually edited.

Outputs from manual editing are as follows:

* Final dataset, newly including variables “prediction\_final“ (i.e. manually edited “hmm\_comb“) and “include\_data“, which defines whether the dataset (or rather its particular part) should be included (“TRUE“, i.e. quality of the data is acceptable), or excluded (“FALSE“, i.e. quality of the data is poor) into subsequent analyses. Dataset is saved as object “b“ in .RData file with the same name as the input file. The input file might be overwritten, or the output file might be saved in another folder.
* Actogram visualization of the manually edited dataset.
* An RData file “summary\_data.RData“ providing two reports summarizing the edits made and final data size.
* The report file “fixed\_data“ reports all edits made on the proceeded file. The report includes these variables and information:
  + “nest“ indicates the name of the input file without an extension
  + “from“ indicates the beginning of the edit
  + “to“ indicates the end of the edit
  + “problem“ indicates the code for type of the edit (see the list of the problem codes below).
  + ! If there was proceeded nest without any edits, than one-row report is generated with from-to indicating the range of the dataset and value “OK“ is inputed as the “problem“.
  + ! If all dataset is assigned to be excluded from subsequent analyses (because of poor data quality), one-row report is generated with from-to indicating the range of the dataset and value “remove“ is inputed as the “problem“.
* The report file “datasets\_final“ summarizes size, and the number of manual edits for particular nests. The report includes these variables and information:
  + “nest“ indicates the name of the input file without an extension
  + “data\_size“ indicates the overall data size (number of rows).
  + “data\_ok“ indicates the size of the data which should be included to subsequent analyses (i.e. „include\_data“==T).
  + “changes\_made“ indicates the number of manual edits made on the particular nest/file.

Workflow of the manual editing:

* At the beginning is necesarry to set the working directories for the input files and all the outpus described before and define the list of files to be manually edited. Also should be either loaded the report objects from previous work, or created as empty objects
* Then, particular files from list are proceeded within loop. Each file is loaded, visualized, and then the query “Co chces?:“ (in English: What do you want?) is printed on the console. Possible responses (“wishes“) are as follows:
  + “z“ – zoom the plot.
  + “f“ – fix some problems (list of problems to be solved is given below).
  + “v“ – visualize the changes on the updated plot.
  + “r“ - remove all the dataset from subsequent analyses (because extraction is of very poor quality).
  + “b“ – go back (i.e. delete the last edit made).
  + “s“ – stop the editing of this dataset and save the outputs.
* The “Co chces?:“ query is asked repeatedly, until the “s“ wish is not used, which breaks the manual editing of the particular dataset.
* If “z“ is chosen, the statement "Select the area for zooming" is printed on the console. Then, selection of area to be zoomed is expected. The selection must be made by clicking at the beginning and at the end of the selected period within a plotted actogram. Then, simplified plot of the selected region is plotted (to the active device!). So far, only zoom of the period within one day is enabled!
* If “f“ is chosen, the statement “select area for the edit“ is printed on the console. Then, selection of area where particular problem should be fixed is expected. The selection must be made by clicking at the beginning and at the end of the selected period within a plotted actogram (or zoomed plot). Then, the query “What is the problem?:“ is printed on the console. Possible responses (“problems“) which may be solved are as follows:
  + “s“ – set the start (i.e. beginning of the first detected incubation bout) at the end of selected area (i.e. at the second of the two selected positions on the plot).
  + “e“ – set the end of the last detected incubation bout at the beginning of selected area (i.e. at the first of the two selected positions on the plot).
  + “g“ – set the selected area as the incubation gap.
  + “i“ – set the selected area as the incubation bout.
  + “p“ – use the HMM prediction (instead of prediction including also the “postprocessing“) within the selected area.
  + “d“ – define that data within the selected area are of poor quality and should be rather excluded from the subsequent analyses.
* If the “v“ is chosen, updated actogram visualization is prepare (i.e. actogram of the whole dataset, incorporating the changes made so far during the manual editing). The plotting is done to the active device.
* If the “b“ is chosen, the last edit made is deleted both from edited dataset and from the report of fixed problems. So far, this can be done only with the truly last edit (i.e. only one times at the time).
* If the “r“ is chosen, the whole dataset is labeled as a “poor quality“.
* If the “x“ is chosen, the work on the particular dataset is breaked, and the edited dataset is saved, together with the report of the edits made. USE THIS CODE TO GO BACK FROM THE „WHAT IS THE PROBLEM“ MENÚ TO THE „CO CHCES“ MENÚ. FOR EXAMPLE, THIS CODE MUST BE USED TO ZOOM OUT ACTOGRAMS, IT SAVES THE CHANGES.
* After ending the work on the particular dataset, a user is asked with another two queries, printed on the console:
  + "save\_plot?(y/n):" asks whether you wish to save the actogram of edited file.
  + "save\_data?:" asks whether you wish to save the data, together with the reports of proceeded edits.
* Then, the loop returns to the beginning and next nest is loaded.