

make_eigspectra_and_tomograms_plus

This program constructs the eigenspectra and tomograms obtained with the PCA. The eigenspectra are generated in the form of a txt file with two columns. The first of these columns has the wavelengths and the second has the weights associated to each wavelength. The tomograms are generated in the form of a fits image. These tomograms have headers which, eventually, can be altered using the program “header_correct_plus”. The input parameters for this program are:

outfolder: directory where ALL output files will be saved

pcs: name of the table (full path), which must be a file in txt or dat format, containing the weight of each variable (wavelength) on each one of the eigenvectors. This table must be constructed in such a way that each eigenvector corresponds to each one of the columns. Besides, the eigenvectors must be positioned (from left to right) in decreasing order of importance, i.e., the first column on the left of the table must correspond to eigenvector 1, the second to eigenvector 2 and so on. If the execution of the PCA is done using the software Matlab, then the table to be used must be the one that is generated by the program with the name PC.

scores: name of the table (full path), which must be a file in txt or dat format, containing the projection of the data on each one of the eigenvectors. This table must be constructed in such a way that each one of its columns corresponds to the projection of the data on each eigenvector. Besides, the eigenvectors must be positioned (from left to right) in decreasing order of importance, i.e., the first column on the left of the table must correspond to the projection of the data on eigenvector 1, the second column must correspond to the projection of the data on eigenvector 2 and so on. If the execution of the PCA is done using the software Matlab, then the table to be used must be the one that is generated by the program with the name SCORE.

minspecpx and maxspecpx: values of the lowest and highest spectral pixel that has been taken into account in the execution of the PCA. The values of these two parameters must be exactly the same of those attributed to the parameters minspecpx and maxspecpx, respectively, of the program “make_table_plus”, used for generate the table used in the execution of the PCA.

lambdazero and deltalambda: parameters of the equation that converts spectral pixels in wavelengths. This equation is given by

$$\lambda = \lambda_{\text{zero}} + (n-1) \cdot \Delta\lambda$$

where n = spectral pixel

λ_{zero} = wavelength corresponding to the spectral pixel given by the parameter minspecpx

$\Delta\lambda$ = wavelength interval between two

consecutive spectral pixels

$\lambda = \text{wavelength}$

eigenspectra_prefix: prefix of the names of the eigenspectra files to be generated. These files (all in txt format) will have two columns of values: the first of them will have the values of the wavelengths and the second will have the weights of each wavelength on the eigenvector. The final names of the files will be given in the following way:

eigenspectra_prefixN1.txt

eigenspectra_prefixN2.txt

eigenspectra_prefixN3.txt

.

.

.

eigenspectra_prefixNi.txt

where N1, N2, N3,..., Ni correspond to the numbers of the constructed

tomograms_prefix: prefix of the names of the tomograms files to be generated. These tomograms (all in fits format) will have headers, whose parameters can be, eventually, altered using the program “header_correct_plus”. The final names of the tomograms files will be given in an analogous way of that of the eigenspectra.

eigenvectors_number: number of eigenvectors to be used to generate the eigenspectra and tomograms.

eigenvectors_list: name of the file (full path) containing the numbers of the eigenvectors that will be used to construct the eigenspectra and tomograms. This file must be configured in the following way:

eigenvectorA

eigenvectorB

.

.

.

eigenvectorN

where eigenvectorA, eigenvectorB,... and eigenvectorN are the numbers of the eigenvectors whose eigenspectra and tomograms shall be constructed by the program

logfile: name of the logfile (full path) to be created.

minspatpx_x and maxspatpx_x: values of the lowest and highest spatial pixel of the horizontal axis of the data cube's images used in the execution of the PCA.

minspatpx_y and maxspatpx_y: values of the lowest and highest spatial pixel of the vertical axis of the data cube's images used in the execution of the PCA.