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eegspline

- **Description**

Computes spline interpolation from an **.eeg** file and creates a new **.eeg** file on any user-defined sensor montage. Resulting **.eeg** file consists in either interpolated potential values or scalp current density values (surface Laplacian), computed on a spherical surface.

- **Usage**

eegspline *myeegfile.eeg* *myparfile.par* *myeegfileout.eeg* [*myelecpositionin.rtp*]

with :

- *myeegfile.eeg*: input **.eeg** file to process (with extension).
- *myparfile.par*: text parameter file (with extension).
- *myeegfileout.eeg*: output file (with extension) after processing by spline computation.
- options:
myelecpositionin.rtp : text file with the list of R, theta, phi coordinates of the recorded channels (channels in *myeegfilein.eeg*). Only theta and phi values will be considered for spline computation (normalized sphere with radius=1). If omitted, electrode coordinates (theta, phi) are read from *elec.dat* file.

- **Fields of parameter file and examples**

spline_channel_flag 1 1 0 1 0 0 0	list of the channels to include in the spline computation: 1/0 for selected/unselected channels; the total number of flags is N+2, N being the number of recorded channels in <i>myeegfilein.eeg</i> ; the last 2 flags should be set to 0. In this example, N=5, and only channels number 1, 2, 4 will be included for computation.
spline_channel_out_nb 6	Number of output channels (interpolated or not).
spline_channel_out_list 13 5 8 10 35 -1	List of output electrode numbers (according to <i>elec.dat</i>) on which spline interpolated values (potential or SCD) are computed. The electrodes with number -1 are not interpolated (e.g. EOG or EMG channels because they have no coordinates on head). To keep the original data in output file, use the -1 and the <i>original_channel_out_nb</i> and <i>original_channel_out_list</i> fields (see below).
original_channel_out_nb 1	Number of output channels with original data (no interpolation).
original_channel_out_list 5	List of electrode indices in the original input EEG file (first is number 1) of the output channel with original data. This electrodes are added at the -1 positions of <i>spline_channel_out_list</i> label with the same order. In this example, the 5 first channels (13, 5, 8, 10 and 35 are corresponding to F7, Pz, T3, Cz and POz in <i>elec.dat</i>) are interpolated from channels 1, 2 and 4. The 6th channel is the copy of the 5th channel of the original file.
spline_scd 1	Flag for computing SCD or potentials: 0 : potential interpolation 1 : SCD interpolation If omitted, <i>spline_scd</i> = 0.
spline_order 3	Spline interpolation order (usually 3 or 4). Suggestion: if regularization is used for potential or SCD, take spline order = 3, otherwise, take spline order = 4.
spline_regul 1	Type of regularization for spline computation: 0 : no regularization 1 : optimized (Tikhonov)

	2 : user-defined lambda (Tikhonov) 3 : user-defined lambda (Wahba)
spline_regul_lambda 0.001	Regularization coefficient for spline interpolation. Required only when spline_regul = 2 or 3.
spline_signal_offset 1	Flag for offset correction of all selected input channels (for each channel, the mean value over the entire recording period is subtracted from the raw signal): 0 : no offset correction 1 : offset correction If omitted, spline_signal_offset = 0.

Format of myelecposition.rtp file :

Text file containing the label 'r_theta_phi' followed by the R, Theta, Phi spherical coordinates of the sensors recorded in the input .eeg file myeegfilein.eeg (one line per sensor following the same order as in myeegfilein.eeg). The R value is not read by the programme, sensors are considered to be on a normalized sphere.

- **Example**
- **Comments**
- **Current version**

1.17 30-07-2015

- **History**

- 1.04 25-05-2005 (OB) : changes label of SCD computing flag (becomes spline_scd, was spline_pot_scd).
- 1.06 04-04-2008 (PEA) : changes label of coordinates file (becomes r_theta_phi field).
- 1.08 27-11-2009 (PEA) : changes in progress display.
- 1.09 27-11-2009 (PEA) : reads data by blocks instead of samples.
- 1.10 30-11-2009 (PEA) : changes for temporary file name (allows many instances of eegspline in one directory).
- 1.11 23-09-2010 (PEA) : update to use cmake and free release of Elan. Remove static allocation for reading EEG file header.
- 1.12 21-02-2011 (PEA) : adds original_channel_out_nb and original_channel_out_list parameters to keep original channel which have no coordinates (e.g. EOG, EMG, ...).
- 1.13 17-11-2011 (PEA) : minor modification.
- 1.14 07-02-2012 (PEA) : removes maximum number of channel test. Removes exit when original_channel_out_nb field is not present.
- 1.15 26-09-2014 (PEA) : change temporary file creation to output directory (was system temporary directory).
- 1.16 30-09-2014 (PEA) : fix reading temporary file error (due to previous change).
- 1.17 30-07-2015 (PEA) : fix rCSL constant initialization.

- **Files**

\$ELANPATH/bin/eegspline

- **See also**

epsd

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CRNL

