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# fsavLEADFIELD_4_GEDAI.mat - Complete Structure Tree
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## Overview
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This file contains a single variable `leadfield4GEDAI` which is a
comprehensive structure containing EEG leadfield data, electrode
information, and associated metadata.
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## Root Structure: `leadfield4GEDAI` [struct 1Ã–1]
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### Basic Fields
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Field	Type	Size	Description	Value/Range
MEGMethod	char	-	MEG computation method	(empty)
EEGMethod	char	-	EEG computation method	`'openmeeg'`
ECOGMethod	char	-	ECOG computation method	(empty)
SEEGMethod	char	-	SEEG computation method	(empty)
Comment	char	-	Head model description	`'OpenMEEG BEM Freesurfer reduced (volume)'`
HeadModelType	char	-	Type of head model	`'volume'`
SurfaceFile	char	-	Surface file reference	`'@default_subject/tess_cortex_pial_low.mat'`

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### Numerical Data Fields
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Field	Type	Size	Min	Max	Mean	Description
Gain	double	343Ã–3630	-81.444	90.696	1.125	Leadfield gain matrix
GridLoc	double	1210Ã–3	-0.086	0.119	-	Grid locations (3D coordinates)
GridOrient	double	0Ã–0	-	-	-	Grid orientations (empty)
gram_matrix	double	343Ã–343	-189959.050	375471.688	15193.185	Gram matrix
gram_matrix_avref	double	343Ã–343	-208813.333	309338.188	~0.000	Average-referenced gram matrix

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### Complex Nested Structures
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## GridOptions [struct 1Ã–1]
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Configuration for grid generation:
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Field	Type	Value	Description
Method	char	`'isotropic'`	Grid generation method
nLayers	double	17	Number of layers

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| **Reduction** | double | 3 | Reduction factor |
| **nVerticesInit** | double | 4000 | Initial number of vertices |
| **Resolution** | double | 0.01 | Grid resolution |
| **FileName** | double | 0Ã-0 | Filename (empty) |
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## electrodes [struct array 1Ã-343]
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Array of 343 electrode structures, each containing:

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| Field | Type | Example (electrode 1) | Description |
|-----|-----|-----|-----|
| **Name** | char | `'Fp1'` | Electrode name |
| **Type** | char | `'EEG'` | Electrode type |
| **Loc** | double [3Ã-1] | `[0.108; 0.030; 0.034]` | 3D location
coordinates |
| **Orient** | double | `[]` | Orientation (empty) |
| **Comment** | char | `''` | Comments (empty) |
| **Weight** | double | 1 | Electrode weight |
| **Group** | double | `[]` | Group assignment (empty) |
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## EEG [struct 1Ã-1]
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Complete EEGLAB structure with recording metadata and processing history.

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### Basic Metadata
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| Field | Type | Value | Description |
|-----|-----|-----|-----|
| **filename** | char | `''` | EEG filename |
| **filepath** | char | `''` | File path |
| **subject** | char | `''` | Subject identifier |
| **group** | char | `''` | Group identifier |
| **condition** | char | `''` | Experimental condition |
| **session** | double | 0Ã-0 | Session number |
| **ref** | char | `'average'` | Reference type |
| **saved** | char | `'no'` | Save status |
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### Recording Parameters
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| Field | Type | Value | Description |
|-----|-----|-----|-----|
| **nbchan** | double | 343 | Number of channels |
| **trials** | double | 1 | Number of trials |
| **pnts** | double | 3630 | Number of time points |
| **srate** | double | 100 | Sampling rate (Hz) |
| **xmin** | double | 0 | Start time (s) |
| **xmax** | double | 36.29 | End time (s) |
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| **times** | double | 1Ã-3630 | Time vector |
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### ICA Fields (all empty)
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| Field | Size | Description |
|-----|-----|-----|
| **icaact** | 0Ã-0 | ICA activations |
| **icawinv** | 0Ã-0 | ICA inverse weights |
| **icasphere** | 0Ã-0 | ICA sphere matrix |
| **icaweights** | 0Ã-0 | ICA weights |
| **icachansind** | 1Ã-59 | ICA channel indices |
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## EEG.chanlocs [struct array 1Ã-343]
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Channel location information for each electrode:
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| Field | Type | Example (channel 1: Fp1) | Description |
|-----|-----|-----|-----|
| **labels** | char | `'Fp1'` | Channel label |
| **type** | char | `''` | Channel type |
| **theta** | double | -19.33 | Polar angle (degrees) |
| **radius** | double | 0.525 | Polar radius |
| **X** | double | 83.92 | Cartesian X coordinate |
| **Y** | double | 29.44 | Cartesian Y coordinate |
| **Z** | double | -6.99 | Cartesian Z coordinate |
| **sph_theta** | double | 19.33 | Spherical theta |
| **sph_phi** | double | -4.49 | Spherical phi |
| **sph_radius** | double | 89.20 | Spherical radius |
| **urchan** | double | 1 | Original channel number |
| **ref** | char | `''` | Reference |
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## EEG.chaninfo [struct 1Ã-1]
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Channel information metadata:
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| Field | Type | Value | Description |
|-----|-----|-----|-----|
| **plotrad** | double | - | Plot radius |
| **shrink** | double | - | Shrink factor |
| **nosedir** | char | `'+X'` | Nose direction |
| **nodatchans** | struct | 1Ã-0 | No-data channels |
| **icachansind** | double | - | ICA channel indices |
| **filename** | char |
`'../toolboxes/eeglab14_1_0b/plugins/dipfit2.3/standard_BESA/standard-10-5-cap385.elp'` | Electrode file |
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## EEG.event [struct array 1Ã—242]
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Event markers (242 events):

Field	Type	Example (event 1)	Description
type	char	`'32766'`	Event type code
latency	double	1	Event latency (samples)
duration	double	0.4	Event duration (s)
urevent	double	1	Unique event index

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## EEG.urevent [struct array 1Ã—499]
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Unique events (499 events):

Field	Type	Example (urevent 1)	Description
type	double	32766	Event type code
latency	double	1	Event latency (samples)
duration	double	1	Event duration (s)

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## EEG.reject [struct 1Ã—1]
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Artifact rejection information (all fields empty 0Ã—0):

- **rejppE**, **rejpp** - Joint probability rejection
- **rejkuratE**, **rejkurat** - Kurtosis rejection
- **rejmanualE**, **rejmanual** - Manual rejection
- **rejthreshE**, **rejthresh** - Threshold rejection
- **rejconstE**, **rejconst** - Constant value rejection
- **rejfreqE**, **rejfreq** - Frequency rejection
- **icarej** - ICA-based rejection fields
- **rejglobalE**, **rejglobal** - Global rejection
- **disprej** - Display rejection (cell)
- **threshold** [1Ã—3] - Threshold values
- **threshentropy** [1Ã—1] - Entropy threshold
- **threshkurtact** [1Ã—1] - Kurtosis activation threshold
- **threshkurtdist** [1Ã—1] - Kurtosis distribution threshold
- **gcompreject** [1Ã—0] - Component rejection

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## EEG.stats [struct 1Ã—1]
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Statistical measures (all fields empty 0Ã—0):

- **jp**, **jpE** - Joint probability
- **icajp**, **icajpE** - ICA joint probability

- ****kurt****, ****kurtE**** - Kurtosis
- ****icakurt****, ****icakurtE**** - ICA kurtosis
- ****compenta****, ****compentr**** - Component entropy
- ****compkurta****, ****compkurtr**** - Component kurtosis
- ****compkurtdist**** - Component kurtosis distribution

EEG.etc [struct 1Ã-1]

Additional metadata:

Field	Type	Value	Description
T0	double	-	Time zero reference
eeglabvers	char	`dev`	EEGLAB version
icaweights_beforerms	double	-	ICA weights before RMS
icasphere_beforerms	double	-	ICA sphere before RMS

History [cell array 1Ã-3]

Processing history:

1. ****Timestamp****: `01-Jun-2025 19:59:10`
2. ****Action****: `compute`
3. ****Description****: `Compute head model: OpenMEEG BEM Freesurfer reduced (volume) | Scalp 1.0000 1922V | Skull 0.0125 1922V | Brain 1.0000 1922V`

EEG.history [char]

Detailed EEGLAB processing history including:

- EEGLAB version tracking (14.1.0 â†’ 14.1.1 â†’ 14.1.2 â†’ dev)
- Data rejection operations
- Channel removal (T7, TP7)
- Spectral analysis
- GEDAI processing (broadband and spectral)
- Average reference application
- Channel interpolation

Summary Statistics

Key Dimensions

- ****Channels****: 343 EEG electrodes
- ****Time points****: 3630 samples
- ****Sampling rate****: 100 Hz

- ****Duration****: 36.29 seconds
- ****Grid points****: 1210 source locations
- ****Events****: 242 event markers (499 unique events)

Matrix Sizes

- ****Gain matrix****: 343 \times 3630 (leadfield)
- ****Gram matrices****: 343 \times 343 (channel covariance)
- ****Grid locations****: 1210 \times 3 (source space)