CLAIMS

1. A computer-implemented method of monitoring brain function in a patient, the method including:

identifying the network connections between the node signals on an EEG recording performed on the patient over a period of time, by using a method of identifying, in a network of interacting nodes simultaneously producing signals, connections between said nodes and of estimating connection coefficients between nodes identified as connected, the method including the steps of:

periodically recording the signal at each node over a predetermined period of time to form a data set;

calculating the coherence and partial coherence between each combination of nodes in the data set;

checking, for each combination of nodes, if either the coherence or the partial coherence is below a first predetermined threshold and, if so, setting the corresponding connection coefficient to zero for all subsequent steps;

a first estimating step of estimating, from the data set, the connection coefficients for the combinations of nodes for which the connection coefficient has not already been set to zero;

for each connection coefficient estimated by said first estimating step to be below a second threshold, setting said coefficient to zero for all subsequent steps; and

a second estimating step of re-estimating, from the data set, the connection coefficients for the combinations of nodes for which the connection coefficients have not already been set to zero.

2. The computer-implemented method according to claim 1 wherein the step of checking involves calculating the product of the calculated coherence and partial coherence for each combination of nodes and determining whether said product is below said first predetermined threshold.

3. The computer-implemented method according to claim 1 or claim 2 wherein the second threshold for the estimated connection coefficients is determined by:

separating the estimated coefficients into two groups according to the squared Euclidean distance of the estimated coefficients, a first group containing those coefficients with high values and the second group containing those coefficients with low values; and

setting said second threshold as a coefficient value which is greater than the value of all coefficients in said second group.

4. The computer-implemented method according to any one of the preceding claims wherein the first and second estimating steps for estimating the connection coefficient estimate the autoregressive coefficients of the data set.

5. The computer-implemented method according to any one of the preceding claims wherein the network is known or predicted to be sparsely connected.

6. The computer-implemented method according to any one of the preceding claims, further including the step of screening the data set to remove outliers.

7. The computer-implemented method according to any one of the preceding claims, further including the step of filtering the data set to remove noise.

8. The computer-implemented method of any one of the preceding claims, the method including the step of:

performing an EEG recording on a patient over a period of time.

9. A system for identifying network connections and estimating connection coefficients between nodes in a data recording of brain activity, the system comprising:

a plurality of sensors for recording the brain activity of an individual at different locations over a predetermined period of time to produce a data set; and

a processor which is configured to:

calculate the coherence and partial coherence between each combination of nodes in the data set;

check, for each combination of nodes, if either the coherence or the partial coherence is below a first predetermined threshold and, if so, set the corresponding connection coefficient to zero for all subsequent steps;

estimate, from the data set, the connection coefficients for the combinations of nodes for which the connection coefficient has not already been set to zero;

for each connection coefficient estimated to be below a second threshold, set said coefficient to zero for all subsequent steps; and

re-estimate, from the data set, the connection coefficients for the combinations of nodes for which the connection coefficients have not already been set to zero.

10. A system according to claim 9 wherein the processor is configured to calculate the product of the calculated coherence and partial coherence for each combination of nodes and determine whether said product is below said first predetermined threshold.

11. A system according to claim 9 or claim 10 wherein the processor is configured to determine said second threshold by:

separating the estimated coefficients into two groups according to the squared Euclidean distance of the estimated coefficients, a first group containing those coefficients with high values and the second group containing those coefficients with low values; and

setting said second threshold as a coefficient value which is greater than the values of all coefficients in said second group.

12. A system according to any one of claims 9 to 11 wherein the processor is configured to estimate the connection coefficients by estimating the autoregressive coefficients of the data set.

13. A system according to any one of claims 9 to 12 wherein the processor is configured to screen the data set to remove outliers.

14. A system according to any one of claims 9 to 13 wherein the processor is configured to filter the data set to remove noise.