

Clusters on SC conformed by FC

comparison of methods

What is done ?

- Groups/clusters in SC should reflect similarities in FC values.
- ROIs having more connections/edges with other ROIs should have similar FC values (not only the strength, but the number of connections also).
- Groups of ROIs in SC is found, and mean and std. deviation of FC values for each group is plotted

Methods Applied

to find
Community Structure

Modularity

Louvian Community method.

hierarchically finds clusters
divide and conquer algorithm.

Newman method.

graph properties of graph modularity
matrix.

Clustering

graph Laplacians

Random-walk graph Laplacian.

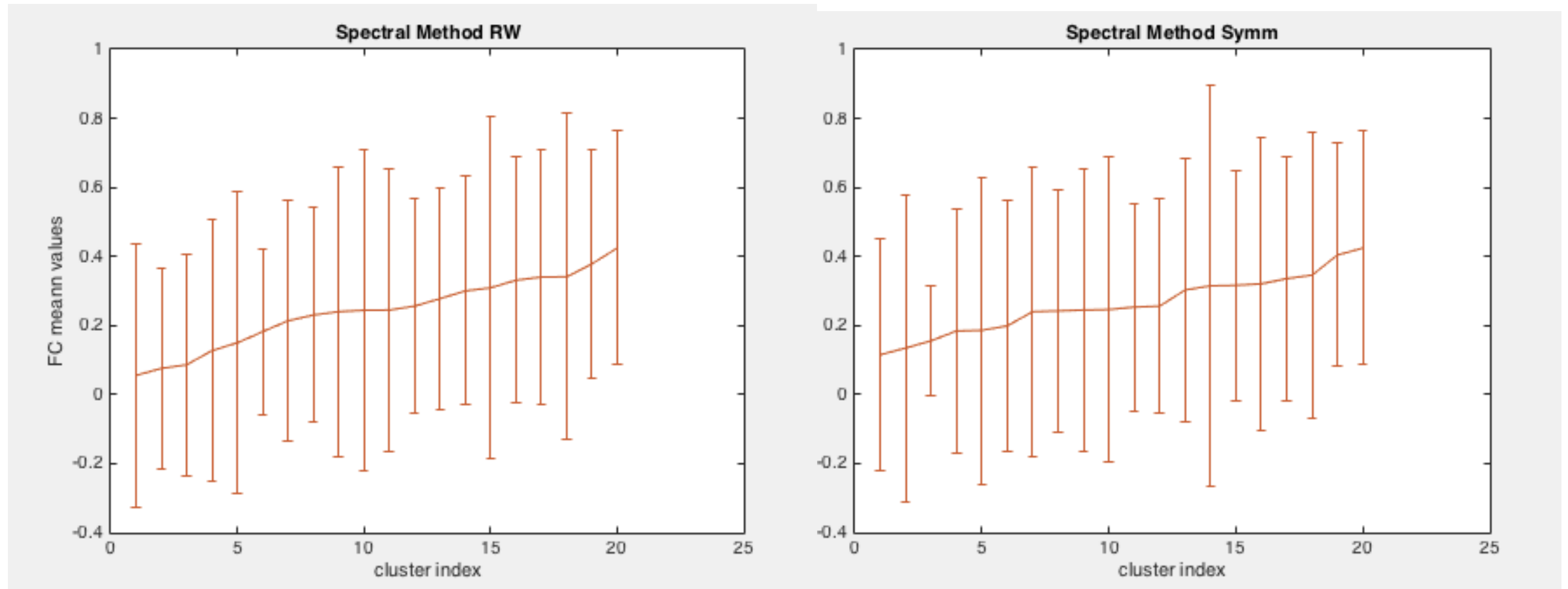
Symmetric graph Laplacian.

Modularity

- Clustering of the network, or finding communities in the network, where the number of clusters is not known a priori.
- **Graph partitioning methods** find the best partition given the requirements of clustering; i.e. number of clusters, their size etc.
- **Community structure methods** normally assume that the network of interest divides naturally into subgroups and the experimenter's job is to find those groups.

Results

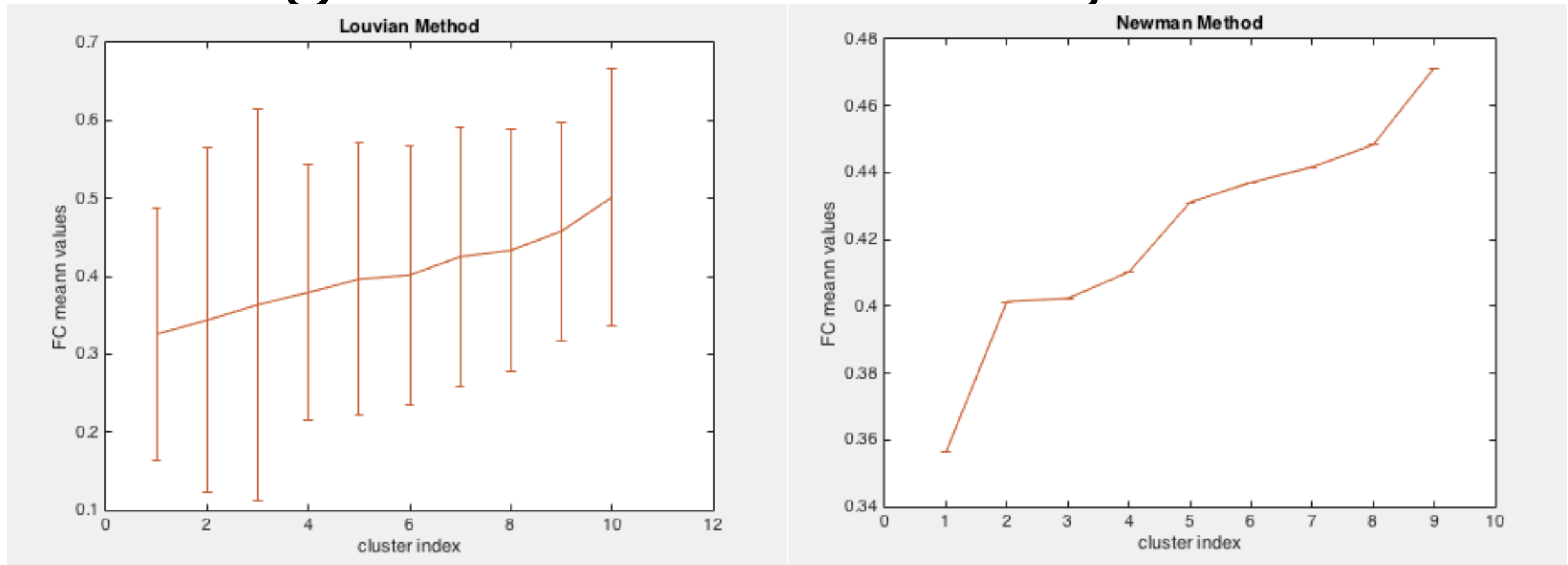
using graph laplacian



every cluster in SC has very high std. deviation of FC values for both types normalized graph Laplacians

Results

using Brain Connectivity Toolbox



mean with standard deviation is plotted.

Newman method finds clusters in SC whose FC values have very small std. deviation

Conclusions

- concept of community structure is captured better by Newman method.
- structural groups having similar FC values supports the idea of multiple scale diffusion.
- statistical correlation of functions on different ROIs then should be at different scales.

Tentative plan for next week

- Apply graph wavelets on FC for multi-scale resolution to find a limit on the number of scales.