

Complex networks help us to understand complicated phenomena, including human brain. One of its key characteristics is its modular organization, also known as community structure. This thesis compares two main community detection algorithms, the Louvain algorithm and the label propagation algorithm. We show some differences in the results of the algorithms. On the other hand, we also discuss their common properties. The practical part of this thesis is devoted to community detection in human brain functional networks. It is known that the community structure of a human brain functional network changes during aging or due to some diseases. We compared the modularity and number of communities in functional networks of patients with the diagnosis of multiple sclerosis before and after a neurorehabilitation therapy. We did not find any significant change considering the whole dataset. However, the modularity changed in the functional networks of the six patients with a primary progressive course of multiple sclerosis. We show that there might be other minor changes in correlation with fMRI protocol or patients' gender.