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The influence of information on the evolution of complex networks

The purpose of this thesis is to measure the influence of information on the evolution of the complex networks topology. An adaptive Boolean network model is applied. The structure has been extended. The proposed network is composed of smaller clusters that are characterised by the differences in connection density. The connections between two nodes are much more probable between elements from the same cluster than those from different subnetworks. A new network model is obtained combining the features of hierarchic systems and adaptive models.

In this thesis C++ programming language has been used to implement required models. A necessary information measure has been defined and series of simulations has been conducted. Among the parameters modified have been: number of clusters, number of nodes in single subnetwork and number of connections linking nodes from different clusters. Finally, the aggregated results have been analysed and conclusions have been drawn. Coevolution of the networks' information and changes of topology has been observed in the network. Both parameters have been found to approach a constant value that is dependent on the structure of the network. It is inferred that the relationship between information and topology changes is complex and other factors substantially affect the simulation results.