



# The Interconnection of Adaptive Modules/Motifs

PID: 2021\DSAI\002

Adaptation is a phenotype exhibited by all living organisms to varying degrees. This trait's universality raises interesting questions about the underlying mechanism that enables it, and this has been a topic of extensive study by various researchers. It is assumed that adaptation can be traced to the underlying gene regulatory network within the organisms' cells. Computational studies have revealed that only two motifs constitute adaptive networks, namely, negative feedback loops and incoherent feedback loops. With these motifs identified, the next step is to find ways to interconnect them to generate more complex adaptive networks. The motifs that have already been identified are made of 2-3 nodes. For adaptive networks having a larger number of nodes, do the two basic motifs act as building blocks or do the motifs themselves get modified in order to retain adaptation?

**Task to be assigned to the intern:** Writing code to generate and/or detect adaptive networks by combining well known adaptive motifs.

**Learning outcome:** Hands-on experience in working on computational network biology problems.

**Duration:** 3 months

**Skills required:** Python programming.

**Pre-requisite courses:** Computational Systems Biology is a plus.

**No. of interns required:** 1