

Clustering via Coherent Network Partition

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Coherent partition of a graph G is defined as a vertex partition that corresponds to a partition composed only of disconnected subgraphs in the complement of G . An optimal coherent partition is defined as a coherent partition induced by an edge cut with the smallest number of edges. Here we characterize some relations between coherent and other types of partitions, including: clique partitions, biclique partitions, and modular graph decompositions. We show that the problem of finding optimal coherent partition in graphs reduces to a problem of finding optimal coherent partition in prime graphs. In addition, we demonstrate an application of coherent partitions in systems biology by introducing a family of parameter-free algorithms to efficiently predict protein complexes in protein-protein interaction networks.