

**Abstract:** An affiliation (or two-mode) network is an abstraction commonly used for representing systems with group interactions. It consists of a set of nodes and their groupings called affiliations. An affiliation can be seen as a non-empty subset of the nodes. Therefore, a common practice is to model an affiliation network as a hypergraph, where each affiliation becomes a hyperedge. Traditionally, bipartite graphs connecting nodes to their affiliations have also been used, where the affiliations make the second kind of nodes, thus the term two-mode network.

In this proposal, we introduce the notion of affiliation network with subsumption, in which no affiliation can be a subset of another. Therefore the addition of a new affiliation subsumes all previously existing affiliations that are subsets of it. A network with this property can be modeled by an abstract simplicial complex whose facets are the affiliations of the network. In recent years, simplicial complexes have been employed in the modeling of various natural and social phenomena; however, facet subsumption and its effect on the network evolution was not extensively studied. We propose to explore several aspects of affiliation networks with subsumption.

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