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Community and hierarchy in generalized collaboration networks<sup>1</sup> HUI CHANG, BEI-BEI SU, DA-REN HE, Yangzhou University — We propose a generalization of social collaboration network, which we term generalized collaboration network. In this kind of network, nodes are defined as actors, two nodes are connected by an edge when they take part and collaborate in a common act. In an act each pair of actors has collaboration relationship therefore an act is described by a clique. Based on the common topological property, we proposed quantitative definitions of network community and hierarchy and their corresponding search algorithms. In a generalized collaboration network, two cliques can share a number of nodes. We define the connecting cliques as '1-hierarchy community' when they share at least one common node between each other; accordingly, we define a '2-hierarchy community' as a set of cliques which are mutually connected through at least two common nodes; in general, a 'h-hierarchy community' is defined as the set of cliques which are mutually connected through at least h nodes. We also propose a novel statistical parameter, i.e. degree of interweavement, to measure the connectivity of the whole network.

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