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For a complex of multi-ary relations [12] it is defined the concept of (k,m)-chain which is a generalization of the concept of chain known from the graph theory. Using (k,m)- chains it is introduced the concept of the distance function and it is proved that this function generate a convexity in the complex of multi-ary relations. It is operating with the concepts of convexity and convex hull, axiomatically defined by F.Levi [29] and we describe the iterative procedure to construct a convex hull for a subset of elements from the complex of multi-ary relations.