

Polytopes from graphs

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Abstract

A *convex polytope* is the smallest convex set containing a given finite set in a Euclidean space. Obviously it is quite easy to get examples of convex polytopes: Choose any finite set in a Euclidean space and take its convex hull. The challenge comes in trying to figure out the facial structure of the polytope. This can be a very difficult task in higher dimensions. – This talk concerns a couple of ways to get convex polytopes from graphs. Using either method, it is easy to describe the facial structure of the polytope in terms of the graph. Some interesting polytopes arise. For example, it is possible to obtain the polytopes that are called *permutahedra*. These polytopes have been studied extensively, and can be regarded as the structures underlying the theory of network flows.

Keywords: convex polytope, graph, permutahedra.