

# $f$ - and $h$ -vectors for complexes, polytopes and beyond

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## Abstract

In this talk we define and present  $f$ - and  $h$ - vectors for polyhedral and simplicial complexes, polytopes and spheres. We present some of what is known and some open problems on what is not known regarding the characterization of these vectors. The  $f$ -vector can be generalized to the *flag vector*, describing the number of face-chains. This is a highly redundant vector where many linear equalities among its entries restrict its structure. We report some recent results and problems on structures of the  $f$ -vectors and flag-vectors of low dimensional polytopes.

**Keywords:**  $f$ -,  $h$ -, flag-vector, polytope, complex,