# Embeddings of Simplicial Complexes – Algorithms & Combinatorics

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We survey a number of results and open questions concerning (from a combinatorialist's point of view) higher-dimensional analogues of graph planarity and crossing numbers, i.e., embeddings of finite simplicial complexes (compact polyhedra) into Euclidean space and other ambient manifolds.

While embeddings are a classical topic in geometric topology, here we focus rather on algorithmic and combinatorial aspects. Two typical questions are the following:

(1) Is there an algorithm that, given as input a finite k-dimensional simplical complex, decides whether it embeds in d-dimensional space?

(2) What is the maximum number of k-dimensional simplices of a simplicial complex that embeds into d-dimensional space?

Time permitting, we will also discuss some maps with more general restrictions on the set of singularities, e.g., maps without r-fold intersection points.

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