

Abstract

## Discrete Morse theory and evasiveness

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Assume that we know a simplicial complex  $K$  with vertices  $x_1, x_2, \dots, x_n$ , and our goal is to determine does an subset (unknown to us)  $\sigma$  of vertices is a face of  $K$ . Simplicial complex  $K$  is evasive if we must ask all questions "Is  $x_i \in \sigma$ ?" in order to give a correct answer.

Kahn, Saks and Sturtevant settled Karp's conjecture that any nontrivial monotone graph property is evasive in the case when the cardinality of the vertex set is a prime power. They show relationship between evasiveness of a complex and its topology.

Using discrete Morse theory, Robin Forman show that the homology of  $K$  is "a measure" of evasiveness of  $K$ . Jakob Jonsson define semi-nonevasive complexes as a family of simplicial complexes that admit an optimal decision tree.

We consider evasiveness and semi-nonevasiveness of order complexes of some class of posets. Also, we investigate under what conditions the properties of being semi-nonevasive are preserved under some operations over posets.