

## PROPERTIES OF EDGE IDEALS

SUSAN MOREY

ABSTRACT. There is a one-to-one correspondence between graphs and square-free monomial ideals generated in degree two. Given a graph  $G$  with vertices  $x_1, \dots, x_n$ , this correspondence is realized by forming an ideal  $I$ , called the edge ideal, where  $x_i x_j$  is a generator of  $I$  if and only if  $x_i$  and  $x_j$  are connected by an edge of  $G$ . This construction generalizes to a correspondence between square-free monomial ideals generated in arbitrary degrees and edges of hypergraphs, or facets of a simplicial complex. Exploiting the dual algebraic and combinatorial natures of square-free monomial ideals has proven to be a fertile source of mathematical results. This talk will consist of a survey of some recent results in this area, with a particular emphasis on edge ideals. I will give examples of how both algebraic and combinatorial proof techniques can be used to extract information about edge ideals, and will mention a few of the open problems in this area.