



# ALGEBRA SEMINAR

## ALGEBRAIC PROPERTIES OF L-CONVEX POLYOMINOES

By

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**Abstract:** Polyominoes are, roughly speaking, plane figures obtained by joining squares of equal size (cells) edge to edge. We establish a connection of polyominoes to commutative algebra by assigning to each polyomino its ideal of inner 2-minors, called Polyomino ideal. Polyomino ideals widely generalizes the class of ideals of 2-minors of a matrix of indeterminates (determinantal ideals), and even the class of the ideals of 2-minors of two-sided ladders. Polyomino ideals also include the meet-join ideals of planar distributive lattices. Typically one determines for such ideals their Gröbner bases, determines their resolution and computes their regularity, checks whether the rings defined by them are normal, Cohen-Macaulay or Gorenstein.

Let  $P$  be a Polyomino,  $K$  be a field and  $S$  be the polynomial ring over  $K$  in the variables  $x_a$  with  $a \in V(P)$ , where  $V(P)$  is the vertex set of  $P$ . We denote by  $IP \subset S$  the ideal generated by the inner 2-minors of  $P$  and by  $K[P]$  the quotient ring  $S/IP$ . We will investigate the algebraic and homological properties of  $K[P]$  for L-convex polyominoes  $P$ .

It is based on joint work with Viviana Ene, Jürgen Herzog and Francesco Romeo.

**Date:** 11 November 2020

**Time:** 14:00

**Place:** ZOOM. To request the event link, please send a message to [sezer@fen.bilkent.edu.tr](mailto:sezer@fen.bilkent.edu.tr)