Abstract

We will discuss a number of geometric and algebraic constructions associated to real hyperplane arrangements, focusing on the monoid of faces and the category of lunes of the arrangement. Basics on hyperplane arrangements will be reviewed.

We will then discuss the beginnings of a theory of noncommutative Mobius functions and its connections to the structure of the algebra of faces. If time allows, we will also discuss an extension of a theorem of Joyal, Klyachko and Stanley relating the homology of the partition lattice to free Lie algebras. These topics are from recent and ongoing joint work with Swapneel Mahajan.