

The Small Chvatal Rank of an Integer Matrix (joint work with Tristram Bogart)

The Chvatal rank of an integer matrix A is the maximum of the minimum number of rounds of cutting planes you have to add to any polyhedron of the form $Ax \leq b$ to obtain its integer hull.

In this talk I will define a related notion called the small Chvatal rank of A which is the minimum number of rounds of an iterated Hilbert basis procedure on the rows of A to obtain all facet directions of the integer hulls of all polyhedra of the form $Ax \leq b$.

The small Chvatal rank is bounded above by Chvatal rank and is hence finite. We give families of matrices where the small Chvatal rank is small (even constant) while the Chvatal rank can be arbitrarily high. On the negative side, we show that small Chvatal rank is not a function of dimension (i.e., the number of columns of A) and can be arbitrarily high even when $n=3$. Finally we relate this notion to that of supernormality, a concept introduced in the study of toric varieties and state some open problems.