
FABRIZIO ZANELLO, MIT and Michigan Tech

On Stanley's matroid h -vector conjecture

A horrendously difficult 1977 conjecture of Richard Stanley's predicts that all matroid h -vectors are pure O -sequences. I will describe a new and more abstract possible approach to it, whose chief goal is translating a substantial portion of the problem into one on the structural properties of pure O -sequences. It relies in part on the recent progress on pure O -sequences, and does not require to construct explicitly a pure monomial order ideal for each given matroid h -vector, as often done in the past.

Using this approach and the Interval Property of socle degree 3 pure O -sequences (proved by M. Boij, J. Migliore, R. Miró-Roig, U. Nagel and myself in an upcoming AMS Memoir), I will outline a solution to Stanley's conjecture for matroids of rank at most 3. I will conclude with some suggestions for future research in this direction. All materials discussed in the talk come from joint work with T. Hà (Tulane) and E. Stokes (NSA).