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Speyer's g conjecture via external activity of a pair of matroids

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In 2009, looking to bound the face vectors of matroid subdivisions and tropical linear spaces, Speyer introduced the g-invariant of a matroid. He proved its coefficients nonnegative for matroids representable in characteristic zero and conjectured this in general. Later, Shaw and Speyer and I reduced the question to positivity of the top coefficient. In work in progress with Berget, we prove the conjecture. This talk will overview the combinatorial ingredients of the proof. The principal ones are the restriction to the diagonal D of the Dilworth truncation of a direct sum of two matroids, and a generalisation of external activity for D using the two matroids it is constructed from.

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