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On the measures satisfying a monotonicity of the surface area with respect to Minkowski sum

If K and L are convex bodies, then K being a subset of L implies the surface area of K is less than the surface area of L. If A,B and C are also convex bodies, then the Lebesgue measure satisfies the following supermodularity inequality for their Minkowski sums: $|A+B|+|A+C| < |A|+|A+B+C|$. In this talk, we explore weighted analogues of these properties by replacing the Lebesgue measure with a nice Borel measure. Recently, G. Saracco and G. Stefani showed that if a Borel measure with density has the monotonicity property, then it must be a multiple of the Lebesgue measure. We study the case of supermodularity for any Radon measure, and show it is equivalent to a variant of the monotonicity problem. We verify that a Radon measure with the supermodularity property must be the Lebesgue measure. We then consider restricted versions of the problem.