Shadow systems, decomposability and isotropic constants

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Intuitively speaking, a local maximizer of the isotropic constant has to be sufficiently 'rigid' to rule out modifications that provably increase the isotropic constant. In this talk, we discuss necessary conditions for local maximizers in terms of two notions of decomposability: (1) RS-decomposability (due to Campi, Colesanti and Gronchi) and (2) Minkowski decomposability of the polar body. Starting with a computation of the second derivative of the isotropic constant, we discuss how a dimension argument can be used out to rule out that certain convex bodies can be local maximizers of the isotropic constant. Using this approach, we recover the result that a local maximizer has to be RS-indecomposable (due to Campi, Colesanti and Gronchi) and extend it to a slightly larger class of shadow systems. With regard to the second notion of decomposability, the approach can be used to show that the polar body of a local maximizer of the isotropic constant can only have few Minkowski summands; more precisely, its dimension of decomposability is at most $\frac{1}{2}(n^2 + 3n)$.