The continuous $d$-step conjecture for polytopes

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Abstract

The curvature of a polytope, defined as the largest possible total curvature of the associated central path, can be regarded as the continuous analogue of its diameter. We prove the analogue of the result of Klee and Walkup. Namely, we show that if the order of the curvature is less than the dimension $d$ for all polytope defined by $2d$ inequalities and for all $d$, then the order of the curvature is less than the number of inequalities for all polytopes.

Keywords: polytopes, diameter, Hirsch conjecture, $d$-step conjecture, central path, curvature.