BERNARDO GONZÁLEZ MERINO, Universidad de Murcia

Sharp stability estimates near the simplex and applications in Convex Geometry

Stability estimates quantify how close a convex body must be to an extremal configuration when it nearly attains equality in a geometric inequality. In this talk, we establish a sharp, dimension-independent stability estimate for the Minkowski asymmetry near its maximal value, attained precisely by simplices.

More precisely, we show that if an n-dimensional convex body K satisfies $s(K) \geq n - \varepsilon$, for some $\varepsilon \in [0, 1)$, then its Banach–Mazur distance to an n-simplex S^n satisfies

$$d_{\mathrm{BM}}(K, S^n) \leq 1 + \varepsilon + \frac{\varepsilon^2}{2(1-\varepsilon)}.$$

This improves previous estimates both in the admissible range of the error and in the strength of the bound, and is optimal to linear order in ε.

We then explore several applications of this stability principle. First, we obtain a sharp stability result for the maximal Banach–Mazur distance to the Euclidean ball, together with a new relation between this distance and the Minkowski asymmetry. Second, we establish a common generalization of Schneider's higher-order Rogers–Shephard inequality and the L_p-Rogers–Shephard inequality, along with stability estimates of optimal linear order. Finally, we derive improved upper bounds for the diameter of the Banach–Mazur compactum in fixed dimensions.

This is a joint work with René brandenberg and Florian Grundbacher.