WHAT IS THE BEST SHAPE? ISODIAMETRIC PROBLEMS ARISING IN AGGREGATION MODELS

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How do pair interactions shape the large-scale behaviour of a cloud of particles (animals, social agents ...) ? In the most basic models, the shape of the cloud is determined by minimizing an attractive-repulsive interaction energy under suitable geometric constraints. When can we expect aggregation to occur? what is the shape of the resulting flock? I will describe recent work on isodiametric capacitor problems that occur as limiting cases.