Petak, 18. novembar 2022, PMF u NovomSadu, Departman za matematiku, sala 61, 3. sprat

13:00-15:00 Seminar SLADIM+

Kinga Nagy: Monohedral Tilings of a Convex Disc with a Smooth Boundary

Abstract: Emerging from an old question of Stein; Kurusa, Lángi, and Vígh studied monohedral tilings of B^2, the unit circular disc in the Euclidean plane. That is, they asked how B^2 can be dissected into n pairwise congruent topological discs. They proved that if $n\le 3$ then the dissections are rotationally generated. We give a far-reaching generalization of the results of Kurusa, Lángi and Vígh for strictly convex discs with a smooth boundary, most importantly a complete description about normal monohedral tilings where we have at most three topological discs as tiles. Some further partial results are proved for non-normal tilings.

V. Vígh: Approximations with disc-polygons

Abstract: We work in the Euclidean plane. The intersection of finitely many congruent circular discs is called a disc-polygon, and the corresponding convexity notion is called spindle-, hyper-, or simply r-convexity. Recently many results were published about how well one can approximate a given convex disc K via disc-polygons.

One direction is to consider random disc-polygons: we choose independent random points according to some probability distribution emerging from K (typically the uniform distribution on K or on $\bd K$), then we take the spindle convex hull of the points to obtain a random disc-polygon K_n. The first typical questions are about the expectations of geometric functionals of K_n, such as area, perimeter or number of vertices.

Another approach is to consider best approximations. For example we can study disc-polygons inscribed in K with at most n vertices that have maximal possible area. The obtained results are mainly of asymptotic nature as $n\to \infty$.

In this talk we survey the known results, show some possible further generalizations and also pose some open problems.

Subota, 19. Novembar 2022, PMF u NovomSadu, Departman za matematiku, Amfiteatar 7

V. Vígh: How to score more goals in football?

Abstract: Recently there was a revolution in the analysis of football games. A huge amount of data is collected in a single game, the performance of players and teams are measured in many new ways. Most of the developed methods are based on different mathematical models. One of the most widely used indicators is the expected goal (xG for short), which measures the quality of a scoring chance. In the talk we try to provide a glimpse into the mathematics of football, and in particular study the following question regarding xG: Which is better, one high quality chance or more smaller chances?