1154-05-274 **Steven Simon*** (`ssimon@bard.edu`) and **Leah Leiner**. *Regular Polygonal Partitions of a Tverberg Type.*

A seminal theorem of Tverberg states that any $T(r,d) = (r-1)(d+1)+1$ points in $\mathbb{R}^d$ can be partitioned into r subsets whose convex hulls have non-empty r-fold intersection. Almost any set of fewer points in $\mathbb{R}^d$ cannot be so divided, and in these cases we ask whether the set can nonetheless be $P(r,d)$–partitioned, i.e., divided into r subsets so that there exist r points, one from each resulting convex hull, which form the vertex set of a prescribed convex d–polytope $P(r,d)$. Our main result shows that this is the case for any generic $T(r,2)-2$ points in the plane and any $r \geq 3$ when $P(r,2) = P_r$ is a regular r–gon. For $r = r_1 \cdots r_k$, $r_i \geq 3$, this generalizes to generic sets of $T(r,2k) - 2k$ points and orthogonal products of regular polygons $P(r,2k) = P_{r_1} \times \cdots \times P_{r_k}$ in $\mathbb{R}^{2k}$, and likewise to $T(2r, 2k+1) - (2k+1)$ points and the product polytopes $P(2r, 2k+1) = P_{r_1} \times \cdots \times P_{r_k} \times P_2$ in $\mathbb{R}^{2k+1}$. As with Tverberg's original theorem, these have topological extensions when r is a prime power, and, using the "constraint method" of Blagojević, Frick, and Ziegler, can be made to satisfy additional conditions such as those of a van Kampen–Flores type. (Received August 27, 2019)