Tverberg-type theorems with altered nerves and problems of Data classification

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Abstract

The classical Tverberg's theorem says that a set with sufficiently many points in \mathbb{R}^d can always be partitioned into m parts so that the (m - 1)simplex is the (nerve) intersection pattern of the convex hulls of the parts. Our main results demonstrate that Tverberg's theorem is but a special case of a much more general situation. Given sufficiently many points, any tree or cycle, can also be induced by at least one partition of the point set. The proofs require a deep investigation of oriented matroids and order types. Our results are strongly related to the classification of data.

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