

How to pierce, partition, divide fairly, color, or embed using topological methods

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We will discuss several different topological methods and their applications to problems in combinatorics and discrete geometry. In the first talk we will discuss fixed point theorems and how to use them to prove results on line transversals, mass partition, and fair division of cakes. In the second talk we will discuss applications of equivariant topology to problems concerning embedding of polytopes in the Euclidean space, and several new generalizations of Tverberg's theorem. We will also see the connection of these results to the chromatic numbers of graphs.