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Title: Some generalizations of the Borsuk–Ulam Theorem

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Let S^n be the n-dimensional sphere, $A : S^n \to S^n$ the antipodal involution and R^n the n-dimensional euclidean space. The famous Borsuk–Ulam Theorem states that, if $f : S^n \to R^n$ is any continuous map, then there exists a point $x \in S^n$ such that $f(x) = f(A(x))$. In this paper we discuss some generalizations and variants of this theorem concerning the replacement either of the domain (S^n, A) by other free involution pairs (X, T), or of the target space R^n by more general topological spaces. For example, we consider the cases where: i) (S^2, A) is replaced by a product involution $(X, T)\times(Y, S) = (X\times Y, T\times S)$, where X and Y are Hausdorff and pathwise connected topological spaces, the involution T is free and the fundamental group of X is a torsion group; ii) R^n is replaced by $M^r \times N^s$, where M^r and N^s are closed manifolds with dimensions r and s, respectively, and $r + s = n$; iii) (S^2, A) is replaced by a product involution as described in i), and R^2 is replaced by the 2-dimensional torus T^2. We remark that i) includes the case in which $(X, T) \times (Y, S) = (X, T)$, by taking $(Y, S) = (\{\text{point}\}, \text{identity})$, and in particular the popular 2-dimensional Borsuk–Ulam Theorem.

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