

Topological waist inequalities

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Abstract:

Gromov proved that every continuous map $f: S^n \rightarrow R^q$ from the n -dimensional standard sphere admits a point $y \in R^q$ such that the preimage $f^{-1}(y)$ has $(n-q)$ -dimensional Hausdorff volume at least $\text{vol}(S^{n-q})$. Every continuous map $f: T^n \rightarrow R^q$ from the n -dimensional torus admits a point $y \in R^q$ such that the cohomology of the preimage $f^{-1}(y)$ has rank at least $(n-q)$. We will explain why statements of this type are important and how they can be proven by the same technique.

Thursday, June 22, 2017, 17:00

MathII 0.101 (Lonza)