Pontificia Universidad Católica del Perú

Escuela de Posgrado & Sección Matemáticas

Seminario de Matemática

The Injective Category Number on Continuous Maps

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Summary: In this talk, we introduce the *injective category number* $\mathrm{IC}(f)$ for a continuous map $f\colon X \to Y$ as a new measure of the injectivity structure of f. This invariant captures the smallest number of open subsets required to locally trivialize the non-injectivity of f, offering a fresh perspective on the complexity of maps. We explore foundational properties of $\mathrm{IC}(f)$, including its behavior under pullbacks and compositions, and provide a cohomological lower bound. When f has finitely many multiple points, we relate $\mathrm{IC}(f)$ to these points explicitly. In the equivariant setting, we study the quotient map $X \to X/G$ for a free G-action on a metric space X and connect $\mathrm{IC}(f)$ to the 2th-index $\mathrm{ind}_2(X, G)$ (arXiv:2312.11957), showing sharpness in the case $G = \mathbb{Z}_2$. These results bridge modern categorical methods with classical questions in Borsuk–Ulam theory. This is a joint work with Roland Rabanal (arXiv:2405.04317).

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