

The Lusternik-Schnirelmann category of general spaces

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Abstract

The Lusternik-Schnirelmann category (LS-category) is a topological invariant that has historically been studied for absolute neighbourhood retracts. I will discuss how the theory of the LS-category can be extended to general metric spaces. Using dimension-theoretic techniques, one can obtain upper bounds for the LS-category of general spaces by generalising the Grossman-Whitehead theorem and Dranishnikov's theorem. One can also obtain lower bounds in terms of cup-length, category weight and Bockstein maps. These results can be used to calculate the LS-category of some compacta like the Menger spaces and Pontryagin surfaces. I will also talk about potential applications of this work to geometric group theory, specifically the possibility of obtaining an analogue to the Bestvina-Mess formula in terms of LS-category.