# Lusternik-Schnirelmann category and cone length

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**Abstract**

Given a space $X$ the Lusternik-Schinrelmann category, $cat(X)$, is defined as minimum number of open sets contractible in $X$ that it takes to cover $X$. If $X$ is a smooth manifold without boundary then $cat(X)$ is a lower bound for the number of critical points of a real function on $X$. The cone length of $X$, $cl(X)$, is the number of steps it takes to build $X$ from a point by attaching cones. Ganea showed that $cl(X)$ is the same as the minimum number of contractible open sets it takes to cover $X$. He also showed that $cat(X) \leq cl(X) \leq cat(X) + 1$. For every $n$ we give examples of spaces such that $cl(X) = n = cat(X)+1$.

This talk should be accessible to graduate students.