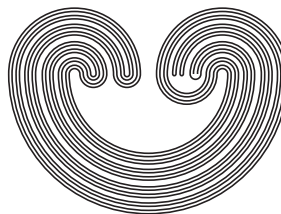


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LUSTERNIK–SCHNIRELMANN CATEGORY OF THE CONFIGURATION SPACE OF COMPLEX PROJECTIVE SPACE

by

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**LUSTERNIK–SCHNIRELMANN CATEGORY OF
THE CONFIGURATION SPACE OF
COMPLEX PROJECTIVE SPACE**

CESAR A. IPANAQUE ZAPATA

ABSTRACT. The Lusternik–Schnirelmann category $cat(X)$ is a homotopy invariant which is a numerical bound on the number of critical points of a smooth function on a manifold. Another similar invariant is the topological complexity $TC(X)$ (a la Farber) which has interesting applications in robotics, specifically, in the robot motion planning problem. In this paper we calculate the Lusternik–Schnirelmann category and, as a consequence, we calculate the topological complexity of the two-point ordered configuration space of $\mathbb{C}\mathbb{P}^n$ for every $n \geq 1$.

1. INTRODUCTION

The *ordered configuration space* of k distinct points of a topological space X (see [4]) is the subset

$$F(X, k) = \{(x_1, \dots, x_k) \in X^k \mid x_i \neq x_j \text{ for all } i \neq j\}$$

topologized as a subspace of the Cartesian power X^k . This space has been used in robotics to try to avoid collisions when one controls multiple objects simultaneously [6].

The first definition of category, given by L. Lusternik and L. Schnirelmann [9], was a consequence of an investigation to obtain numerical

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