Mathematics > Algebraic Topology

Topological complexity of motion planning in projective product spaces

Jesus Gonzalez, Mark Grant, Enrique Torres-Giese, Miguel Xicotencatl

(Submitted on 1 Jun 2012)

We study Farber's topological complexity (TC) of Davis' projective product spaces (PPS's). We show that, in many non-trivial instances, the TC of PPS's coming from at least two sphere factors is (much) lower than the dimension of the manifold. This is in high contrast with the known situation for (usual) real projective spaces for which, in fact, the Euclidean immersion dimension and TC are two facets of the same problem. Low TC-values have been observed for infinite families of non-simply connected spaces only for H-spaces, for finite complexes whose fundamental group has cohomological dimension not exceeding 2, and now in this work for infinite families of PPS's. We discuss general bounds for the TC (and the Lusternik-Schnirelmann category) of PPS's, and compute these invariants for specific families of such manifolds. Some of our methods involve the use of an equivariant version of TC. We also give a characterization of the Euclidean immersion dimension of PPS's through generalized concepts of axial maps and, alternatively, non-singular maps. This gives an explicit explanation of the known relationship between the generalized vector field problem and the Euclidean immersion problem for PPS's.

Comments:	16 pages
Subjects:	**Algebraic Topology (math.AT)**
MSC classes:	55M30, 57R42, 68T40
Cite as:	**arXiv:1206.0271 [math.AT]**
	(or **arXiv:1206.0271v1 [math.AT]** for this version)

Submission history

From: Jesus Gonzalez [view email]
[v1] Fri, 1 Jun 2012 18:38:15 GMT (19kb)

Which authors of this paper are endorsers?