J. DIFFERENTIAL GEOMETRY
4 (1970) 339-348

NONDEGENERATE HOMOTOPIES OF CURVES ON THE UNIT 2-SPHERE

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The purpose of this paper is to prove

Theorem 1. *There are* 6 *second order nondegenerate regular homotopy classes of closed curves on the unit* 2*-sphere.*

Throughout this paper S^2 refers to the unit 2-sphere in E^3. A second order nondegenerate curve in S^2 is an immersion of S^1 in S^2 such that the geodesic curvature is continuous and nonzero. A regular homotopy of curves on S^2, $h: S^1 \times I \to S^2$, is called nondegenerate if each curve $h_t: S^1 \to S^2$ is nondegenerate and if the geodesic curvature is continuous on $S^1 \times I$. The homotopies we consider are free, or without base point, and the curves are oriented curves.

Proposition 2. *The following* 6 *curves, when projected via central projection into a hemisphere of* S^2*, are in different nondegenerate homotopy classes.*

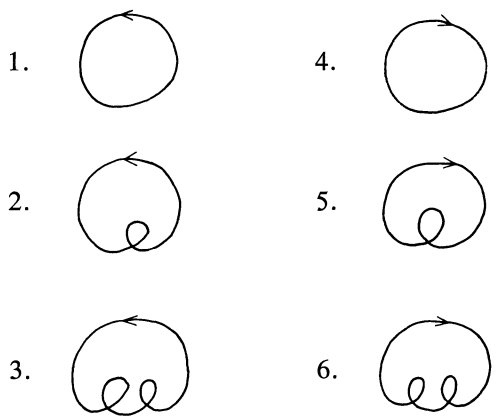

Fig. 1

This proposition is an observation of William F. Pohl.

Proof. We fix an orientation of S^2 by saying that a tangent frame e_1e_2 to

Communicated by S. S. Chern, August 18, 1969. Work done under the support of a visiting Leverhulme Fellowship to the University of Liverpool.