ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

5. Differential Geometry and Global Analysis

1991 MS Classification: 53

Tanaka, Minoru, Tokai University, & ITOH, Jin-ichi, Kumamoto University, Japan

Sard Theorem for the distance function

Let N be a closed submanifold of complete smooth Riemannian manifold M. A point q in M is called a *critical point* of the (Riemannian) distance function $d(N, \cdot)$ from N if for any unit tangent vector v at q, there exists an N-segment γ joining q to N such that the angle made by v and γ at q is not greater than $\frac{\pi}{2}$. Here *N-segment* is a geodesic segment $\gamma : [0, b] \to M$ such that $d(N, \gamma(t)) = t$ holds on $[0, b]$. A positive number c is called a *critical value* if there exists a critical point q of the distance function with $d(N, q) = c$.

Theorem (Itoh-Tanaka). *If M is 3-dimensional, then the set of all critical values of the distance function from N is of measure zero.*