A FACTOR THEOREM FOR FRÉCHET MANIFOLDS

BY R. D. ANDERSON AND R. SCHORI[1]

Communicated by R. D. Anderson, August 9, 1968

1. **Introduction.** A *Frechet manifold* (or *F-manifold*) is a separable metric space M having an open cover of sets each homeomorphic to an open subset of the countable infinite product of open intervals, s. A *Q-manifold* is a separable metric space M having an open cover of sets each homeomorphic to an open subset of the Hilbert cube, I^∞. It is known that all separable metric Banach manifolds modeled on separable infinite-dimensional Banach spaces are F-manifolds. The following are the principle theorems of this paper.

THEOREM I. *If M is any F-manifold, then $s \times M$ is homeomorphic to M.*

THEOREM II. *If M is any Q-manifold, then $I^\infty \times M$ is homeomorphic to M.*

Since s is known, [1] or [3], to be homeomorphic to $s \times I^\infty$, from Theorem I we immediately have the following.

COROLLARY. *If M is any F-manifold, then $I^\infty \times M$ is homeomorphic to M.*

Almost identical proofs of Theorems I and II can be given. To emphasize the ideas of our proofs of Theorems I and II we shall outline instead a proof of the similar but notationally easier

THEOREM I′. *If M is any F-manifold and J^0 is the open interval $(-1, 1)$, then $J^0 \times M$ is homeomorphic to M.*

2. **Lemma 2.1 implies Theorem I′.**

DEFINITION. Let r be a map, i.e. continuous function, of a space X into the closed unit interval $[0, 1]$. Let $J^0(0) = \{0\}$ and for $t \in (0, 1]$, let $J^0(t) = (-t, t)$. Then $J^0 \times^r X = \{(y, x) \in J^0 \times X : y \in J^0(r(x))\}$ is the *variable product* of J^0 by X (with respect to r).

LEMMA 2.1. *Let U be an open subset of s, let $V \subset W \subset U$ where W is open and V is closed in U, and let $J^0 \times^{r_0} U$ be a variable product of J^0*

[1] This paper is a brief resume of a paper *Factors of infinite-dimensional manifolds*, submitted by the authors to Trans. Amer. Math. Soc. The research was supported in part under NSF grants GP 6867 and GP 8637.