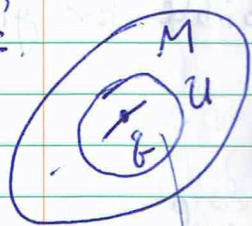


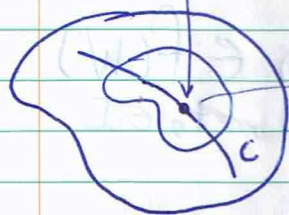
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Lemma: M : complete
 $f: M \rightarrow N$ local diffeo, onto
 If $|df_p(v)| \geq |v|, \forall p \in M, v \in T_p M$
 then f is a covering map.

PF

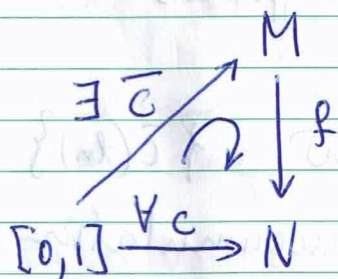


f : diffeo



N

$c(0) = f(q)$



path-lifting

\bar{c} exists for $t \in [0, \varepsilon]$ because f is local diffeomorphic.

$A = \{ t \in [0, 1] : c \text{ can be lifted on } A \text{ starting from } q \}$

A is open ^(on right) since f local diffeo

$A \neq \emptyset$. say $\varepsilon \in A$.

let $t_n \nearrow t_0$, show: $t_0 \in A$

Claim: $\{ \bar{c}(t_n) \} \subset K \Subset M$, for some K

If not, $d(\bar{c}(t_n), \bar{c}(0)) \rightarrow \infty$ since M complete