

ON UNSMOOTHABLE DIFFEOMORPHISMS

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There exists on any two-manifold M a C^r diffeomorphism f which is not topologically conjugate to any C^{r+1} diffeomorphism for every $r \geq 0$.

The basic construction is on the annulus and consists of a sequence of annuli the sides of which are fixed and the center circles of which are rotated. The annuli converge to a fixed circle. After carefully specifying the rotation number of each center circle the widths of the annuli can be chosen so as to make the function C^r but they cannot be wide enough for f to be C^{r+1} at the limit circle. Since the speed of the rotation cannot be effectively altered under a topological conjugacy there is no way to make the function C^{r+1} .

By suspending we obtain examples of foliations on $M \times S^1$ which are C^r but cannot be made C^{r+1} .

The full details of the construction and the proof of invariance under a topological conjugacy are given in [1].

I am informed that C. Fefferman and W. Thurston have also constructed such an example (unpublished).

REFERENCE

1. Jenny Harrison, *Unsmoothable diffeomorphisms*, Warwick University Notes (to appear).

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