

1072-51-47

Jonas Aziz Azzam* (jonasazzam@math.ucla.edu) and **Raanan Schul** (schul@math.sunysb.edu). *Quantitative Implicit Function and Extension Theorems for Lipschitz Maps*.

We discuss recent work with Raanan Schul. “All Lipschitz maps from R^7 to R^3 are orthogonal projections”. This is of course quite false as stated. There is, however, a surprising grain of truth in this statement.

We show that all Lipschitz maps from R^7 to R^3 (with 3-dimensional image) can be precomposed with a map $g : R^7 \rightarrow R^7$ such that $f \circ g$ will satisfy, when we write the domain as $R^4 \times R^3$ and restrict to E , a large portion of the domain, that $f \circ g$ will be constant in the first coordinate and bi-Lipschitz in the second coordinate. Geometrically speaking, the map g distorts R^7 in a controlled manner, so that the fibers of f are straightened out. Moreover, the target space can be replaced by any metric space!

Our results are quantitative. The size of the set E is an important part of the discussion, and examples such as Kaufman’s 1979 construction of a singular map of $[0, 1]^3$ onto $[0, 1]^2$ are motivation for our estimates.

On route we will discuss an extension theorem which is used to construct the bi-Lipschitz map g . We show that for any $f : [0, 1]^n \rightarrow R^D$ whose image has positive content, one may extend f from a large subset of its domain to a global bi-Lipschitz map $F : R^n \rightarrow R^D$. (Received June 12, 2011)