

Meeting: 1003, Atlanta, Georgia, MAA CP X1

1003-X1-1435 **Frank Swenton*** (fswenton@alumni.princeton.edu). *What language of mathematical objects is most suitable for the discussion of limits: real numbers, infinitesimals, or something else?*

Whorf's Principle of Linguistic Relativity states, in short, that language affects cognition. Thus we should be sure to have, for any given mathematical topic, a suitable language within which that topic can be clearly and precisely discussed.

The limit is the most pivotal, and simultaneously the most problematic, topic of the first-year calculus curriculum. Viewing its problematic nature through the lens of Whorf's Principle, a quick stroll through some simple examples from calculus will clearly demonstrate the insufficiency of the real numbers as a language of mathematical objects to be used in the discussion of limits.

We will proceed to address the question, "if not the real numbers, then what," introducing a language that naturally fits the limit context. This system of mathematical objects addresses the shortcomings and pitfalls inherent in both the standard treatment of limits via real numbers and the alternative treatment via classical infinitesimals, and it provides greater unity among intuitive notions, computation, and mathematical formalization of limits. (Received October 05, 2004)