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Marx, Mao and Mathematics: the Story of Nonstandard Analysis in China and the Cultural Revolution

The "Mathematical Manuscripts" of Karl Marx were first published (in part) in Russian in 1933, along with an analysis by S. A. Yanovskaya. Friedrich Engels was the first to call attention to the existence of these manuscripts in the preface to his *Anti-Duehring* [1885]. A more definitive edition of the "Manuscripts" was eventually published, under the direction of Yanovskaya, in 1968, and subsequently numerous translations have also appeared. Marx was interested in mathematics primarily because of its relation to his ideas on political economy, but he also saw the idea of variable magnitude as directly related to dialectical processes in nature. He regarded questions about the foundations of the differential calculus as a "touchstone of the application of the method of materialist dialectics to mathematics. "
Nearly a century later, Chinese mathematicians explicitly linked Marxist ideology and the foundations of mathematics through a new program interpreting calculus in terms of nonstandard analysis. During the Cultural Revolution (1966-1976), mathematics was suspect for being too abstract, aloof from the concerns of the common man and the struggle to meet the basic needs of daily life in a still largely agrarian society. But during the Cultural Revolution, when Chinese mathematicians discovered the mathematical manuscripts of Karl Marx, these seemed to offer fresh grounds for justifying abstract mathematics, especially concern for foundations and critical evaluation of the calculus. At least one study group in the Department of Mathematics at Zhejiang Teachers College issued its own account of "'The Brilliant Victory of Dialectics – Notes on Studying Marx's 'Mathematical Manuscripts', " [1975].
Inspired by nonstandard analysis, introduced by Abraham Robinson only a few years previously, some Chinese mathematicians adapted the model Marx had laid down a century earlier in analyzing the calculus, and especially the nature of infinitesimals in mathematics, from a Marxist perspective. But they did so with new technical tools available thanks to Robinson but unknown to Marx when he began to study the calculus in the 1860s. As a result, considerable interest in nonstandard analysis has developed subsequently in China, and almost immediately after the Cultural Revolution

was officially over in 1976, the first all-China conference on nonstandard analysis was held in Xinxiang, Henan Province, in 1978.