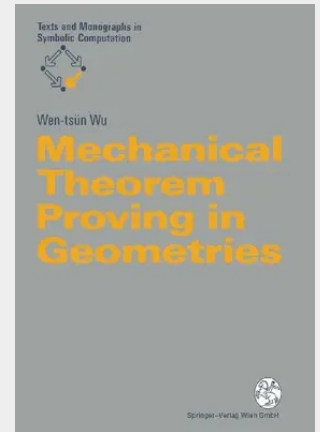


Mechanical Theorem Proving in Geometries

Basic Principles

There seems to be no doubt that geometry originates from such practical activities as weather observation and terrain survey. But there are different manners, methods, and ways to raise the various experiences to the level of theory so that they finally constitute a science. F. Engels said, "The objective of mathematics is the study of space forms and quantitative relations of the real world." During the time of the ancient Greeks, there were two different methods dealing with geometry: one, represented by the Euclid's "Elements," purely pursued the logical relations among geometric entities, excluding completely the quantitative relations, as to establish the axiom system of geometry. This method has become a model of deduction methods in mathematics. The other, represented by the relevant work of Archimedes, focused on the study of quantitative relations of geometric objects as well as their measures such as the ratio of the circumference of a circle to its diameter and the area of a spherical surface and of a parabolic sector. Though these approaches vary in style, have their own features, and reflect different viewpoints in the development of geometry, both have made great contributions to the development of mathematics. The development of geometry in China was all along concerned with quantitative relations.

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