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Historia Mathematica

Volume 3, Issue 1, February 1976, Pages 21-49

Shifting the foundations: Descartes's transformation of ancient geometry

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[https://doi.org/10.1016/0315-0860\(76\)90004-5](https://doi.org/10.1016/0315-0860(76)90004-5)

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Abstract

The aim of this paper is to analyse how the bases of Descartes's geometry differed from those of ancient geometry. Particular attention is paid to modes of specifying curves of which two types are distinguished – Specification by genesis and Specification by property. For both Descartes and most of Greek geometry the former was fundamental, but Descartes diverged from ancient pure geometry by according an essential place to the imagination of mechanical instruments. As regards specification by property, Descartes's interpretation of the multiplication of (segments of) straight lines as giving rise to a straight line (segment), together with newer methods of artificial symbolism, led to more concise and suggestive modes of representation. Descartes's account of ancient procedures is historically very misleading, but it allowed him to introduce his own ideas more naturally.

Résumé

Ce mémoire a pour but d'analyser comment les fondements de la géométrie de Descartes diffèrent de ceux de la géométrie antique. Une attention particulière est donnée aux modes de la spécification de courbes, dont deux genres sont distingués : « spécification par genre » et « spécification par propriété ». Pour Descartes et pour la plupart de la géométrie grecque, c'était le premier genre qui était fondamental, mais Descartes a divergé de la géométrie pure des anciens en accordant à l'imagination d'instruments mécaniques un rôle essentiel. En ce qui concerne la spécification par propriété, l'interprétation avancée par Descartes de la multiplication de lignes droites (segments de telles lignes) comme produisant (un segment d') une ligne droite, ainsi que des méthodes plus récentes de symbolisation artificielle, a abouti à des modes de représentation plus concis et plus suggestifs. La description de Descartes des procédés antiques est, historiquement, très trompeuse, mais elle lui a permis d'introduire ses idées propres d'une façon plus naturelle.



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