

On Categorical Theory-Building: Beyond the Formal

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Abstract

Formal Axiomatic method as exemplified in Hilbert's *Grundlagen der Geometrie* is based on a structuralist vision of mathematics and science according to which theories and objects of these theories are to be construed "up to isomorphism". This structuralist approach is tightly linked with the idea of making Set theory into foundations of mathematics. Category theory suggests a generalisation of Formal Axiomatic method, which amounts to construing objects and theories "up to general morphism" rather than up to isomorphism. It is shown that this category-theoretic method of theorybuilding better fits mathematical and scientific practice. Moreover so since the requirement of being determined up to isomorphism (i.e. categoricity in the usual model-theoretic sense) turns to be unrealistic in many important cases. The category-theoretic approach advocated in this paper suggests an essential revision of the structuralist philosophy of mathematics and science. It is argued that a category should be viewed as a far-reaching generalisation of the notion of structure rather than a particular kind of structure. Finally, I compare formalisation and categorification as two alternative epistemic strategies.

Keywords: category theory, axiomatic method

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