Concept Formation in Mathematics

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Abstract

This thesis consists of three overlapping parts, where the first one centers around the possibility of defining a measure of the power of arithmetical theories. In this part a partial measure of the power of arithmetical theories is constructed, where "power" is understood as capability to prove theorems. It is also shown that other suggestions in the literature for such a measure do not satisfy natural conditions on a measure. In the second part a theory of concept formation in mathematics is developed. This is inspired by Aristotle's conception of mathematical objects as abstractions, and it uses Carnap's method of *explication* as a means to formulate these abstractions in an ontologically neutral way. Finally, in the third part some problems of philosophy of mathematics are discussed. In the light of this idea of concept formation it is discussed how the relation between formal and informal proof can be understood, how mathematical theories are tested, how to characterize mathematics, and some questions about realism and indispensability.