

- LIRON COHEN, *A Minimal Predicative Framework for Formalizing Mathematics*.
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According to the well-known indispensability argument, the indispensability of mathematics to empirical science justifies the belief in the existence of mathematical entities. Thus, we should have ontological commitment to all and *only* those mathematical entities that are indispensable to current scientific theories. In this work we adopt the predicative approach to mathematics in order to identify the minimal set-theoretical ontological commitments and axioms which are truly indispensable for mathematical practice. This approach is arguably the most appropriate framework for developing computationally-oriented mathematics, while still being sufficient for scientifically applicable mathematics. Thus we present a basic, first-order set-theoretical proof system whose minimal model is the universe J_2 . Its most important feature is that it reflects real mathematical practice as presented in ordinary mathematical discourse by making extensive use of abstract set terms. We show that even on the first-order level, most of classical analysis can be carried out already within this minimal framework. Working in such a minimal framework has several advantages. The theory we develop is definitional in the sense that every object which is used in it is definable by some closed term of the language. This allows for a very concrete, computationally-oriented interpretation of the theory. What is more, it makes the framework appropriate for mechanical manipulations and for interactive theorem proving. However, the restriction to this minimal, concrete framework also has of course its price. Not all standard mathematical structures are elements of J_2 (the real line is a case in point). Hence, we have to treat such objects in a different manner, i.e., as proper classes.

[1] ARNON AVRON, LIRON COHEN, *A Minimal Framework for Applicable Mathematics*, Submitted.