Completeness and Categoricity, Part I: 19th Century Axiomatics to 20th Century Metalogic

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Abstract

This paper is the first in a two-part series in which we discuss several notions of completeness for systems of mathematical axioms, with special focus on their interrelations and historical origins in the development of the axiomatic method. We argue that, both from historical and logical points of view, higher-order logic is an appropriate framework for considering such notions, and we consider some open questions in higher-order axiomatics. In addition, we indicate how one can fruitfully extend the usual set-theoretic semantics so as to shed new light on the relevant strengths and limits of higher-order logic.

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