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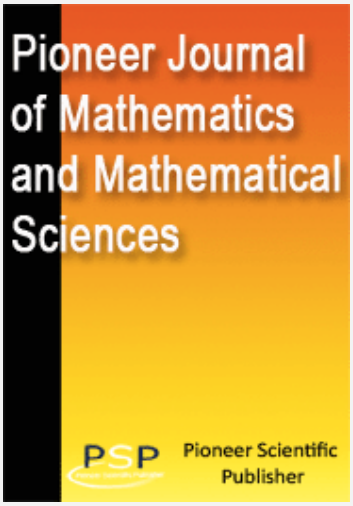

THE LOGIC BEHIND EQUATIONAL THEORIES

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Abstract

Equational logic is a formalization of the deductive methods encountered in studying the set of all equations that can be derived from a given fixed set of equations. So it is naturally associated with abstract algebraic structures. The equations involved are interpreted as being true for all the variables involved and so are best thought of as identities. In complexity, equational logic sits somewhere between propositional and first-order logic. And even though it may appear simple at first sight, many of the problems are very interesting and non-trivial. Several are actually quite difficult and some are still open. In this article our goal is to introduce equational logic as a bridge from the propositional logic to the first-order logic and contrast it with them. This will help us to better understand that the logic behind mathematics is not just simply first order logic - it is a multi-layered system of logics.

Keywords and phrases: equational logic, consistent, axiomatizable, algorithmically decidable.