Referee report for the paper
"A Study of Axiomatizability And Decidability of the Mathematical Structures"
by Zahra Sheikhaleslami
submitted to "Mathematical notes of NEFU"

Actually, the paper is a compilation of known results, easy–to–prove results, and incorrect statements. The paper should be rejected.

Here are only some remarks.

- On p. 1, the author claims to answer the question (marked as Main Problem 1), whether the structure $\langle Q; \sqsubseteq \rangle$, where $\sqsubseteq$ is the divisibility relation, is decidable. Taking into account that $x \sqsubseteq y$ (x divides y, i.e. $\exists t(xt = y)$) in Q (rational numbers) is equivalent to $x = 0 \to y = 0$, all the formulas of the language $\sqsubseteq$ can be effectively transformed into equivalent formulas of the language of the signature consisting of a single constant 0. Quantifier elimination for this language is known (and is an easy exercise). It follows that the theory of $\langle Q; \sqsubseteq \rangle$ is decidable.

- Further on, the author claims to prove quantifier elimination for atomic Boolean algebras, which is a false statement, because one can easily ascertain that the theory of Boolean algebras, $T_{\rm BA}$, is not submodel complete in the standard signature: let D be the diagram of a subalgebra generated by some $a \neq 0, 1$; then $T_{BA} + D$ is not complete: it does not answer neither the first order question "is a an atom?" nor its negation. Although, atomic Boolean algebras are known to admit quantifier elimination in some extended signatures.

- The paper also contains too much full proofs of well–known statements accompanied with references to appropriate literature without special reasons, which is not 'comme il faut' for research papers. So are, for example, Theorems 4,5,13 and more.

- For Theorem 9, there is no neither proof nor reference to a proof.

- Theorem 10 is a well–known result that can be found in many books on model theory for beginners.

- Theorem 11. The result easily follows from submodel completeness of this theory.

- Theorem 14 says that the theory of $\langle R; < \rangle$ admits quantifier elimination. One does not need to give an extra proof just because this is a well–known theory of dense linear orderings without endpoints, for which the result is known.

Actually, I can give much more remarks on the paper. I understand that the author will be unhappy of my reference; but I wish her not to give up.

Referee