

Peer Review

Review of: "A Review of Formal Methods in Quantum Circuit Verification"

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The paper titled "A review of formal methods in quantum circuit verification" reviews the different formal methods used for the verification of quantum circuits.

The authors should have discussed formal verification and the different formal verification techniques and then categorised the different cited papers under them, which has not been done cleanly in the paper.

The author should have focused more on categorising than on summarising the recent works.

(a). Different formal verification methods are Abstract interpretation, model checking, theorem proving, deductive verification, and etc., some of which the author has mentioned in section 2.2.

There should be a separate section for detailed discussion on formal verification, and the different techniques like abstract interpretation, model checking, theorem proving, etc., should be included as subsections.

(b). It is not clear why there are two main sections for Barrier certificates and Abstract Interpretation, while model checking, theorem proving, and runtime verifications are included under "other formal method".

(c) The author has discussed the Barrier certificates method, but it has not been categorised under any formal method.

(d) The author has created section 6 under which there are subsections – Quantum error correction, compiler verification, and quantum algorithm. The objective of section 6 is not clear. Quantum algorithm is not an appropriate heading.

(e). The sections and subsections of this paper are highly misleading.

Declarations

Potential competing interests: No potential competing interests to declare.