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**Manuscript title:**

Research on multiplication routine based on reconfigurable four-valued logic processor

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**Authors’ contributions:**

1. Shanchuan Liao: Proposed the reconfigurable four-valued logic multiplication routine; performed MSD number conversion and M-transform partial product calculation; reviewed and edited the manuscript.
2. Shuang Li: Prepared the initial draft of the manuscript; provided guidance on MSD digital system theory; participated in reviewing and editing the manuscript.
3. Xingquan Gu: Constructed the JW-MSD adder; conducted testing experiments; validated the experimental results.
4. Luqun Li: Prepared the calculation data; participated in reviewing and editing the manuscript.
5. Sulan Zhang: Provided guidance on the manuscript; made revisions to the manuscript.
6. Xiaofeng Li: Designed the pipeline for the reconfigurable four-valued logic multiplication routine; prepared the initial draft of the manuscript.

We follow Council of Science Editors (CSE) recommendation of authorship, which is based on the following 3 criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Final approval of the version to be published; AND
3. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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| ShanChuan Liao:  Proposed the reconfigurable four-valued logic multiplication routine.  Performed MSD number conversion and M-transform partial product calculation.  Reviewed and edited the manuscript.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work.  Shuang Li:  Prepared the initial draft of the manuscript.  Provided guidance on MSD digital system theory.  Participated in reviewing and editing the manuscript.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work.  Xingquan Gu:  Constructed the JW-MSD adder.  Conducted testing experiments.  Validated the experimental results.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work.  Luqun Li:  Prepared the calculation data.  Participated in reviewing and editing the manuscript.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work.  Sulan Zhang:  Provided guidance on the manuscript.  Made revisions to the manuscript.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work.  Xiaofeng Li:  Designed the pipeline for the reconfigurable four-valued logic multiplication routine.  Prepared the initial draft of the manuscript.  Provided final approval of the version to be published.Agreed to be accountable for all aspects of the work. |

**Conflicts of interest**

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