Responses to Reviews

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1 General Response

We thank all the reviewers for their invaluable comments, which help us a lot in improving the paper.

According to the comments, we make several minor revisions, which are highlighted in the manuscript. And detailed responses to all the comments are shown in the rest of this document.

2 Responses to Reviewer 1

COMMENT:

I have read the revised version of the article. Overall, the authors did a very good job at addressing the reviewers' comments and I now consider the paper to be acceptable for publication.

The revised version of this paper has been improved following the suggestions given by the reviewers of the original submission:

(1) Sections II.B and IV are improved to be more self-contained now.

(2) A more detailed but simplified version of a proof of Theorem 2 is now included in an Appendix, and the authors refer the detailed proof to a non-anonymous technical report.

However, due to the importance of this theorem, I suggest to put the complete detailed proof in the printed version.

In summary, I am satisfied with the revisions made by the authors and consider that the paper can now be accepted for publication.

RESPONSE:

Thanks for your positive comments.

We agree that Theorem 2 is very important and that is also the reason we have carefully revised the proof and extended it to contain all necessary deduction steps. However, due to the space limit of TIE, we found it almost impossible to include the proof without comprising other important details of

the paper. As a result, we have to put the detailed proof as a separate technical document.

3 Responses to Reviewer 2

3.1 General Comments

COMMENT:

My most important concerns have been addressed, so I think the paper is now in a shape acceptable for publication. I couldn't check the proof completely, but it appears sound.

The significance of the paper remains not very high, because the paper shows the proposed technique can be used in one particular case while it does not provide results of general validity.

Nevertheless, as I said in my previous review, I believe these initial results may be useful for readers, since there seem to be no other paper providing a similar detail level in the models.

RESPONSE:

Thank you very much for the approval.

3.2 Detailed Comments

COMMENT:

[Section II.B, page 2] left column, lines 37-38: What are u_j and v_j? Are they terms too? This should be specified in the text.

RESPONSE:

Yes, they are terms as well. This is specified now.

COMMENT:

[Section II.B, page 2] left column, lines 42-46: I guess s' is the destination state. This should be specified in the text. The sentence "IR and TR together..." should not be part of the item. It should go into a new paragraph after the list.

RESPONSE:

Yes, thank you for pointing this out. They are modified now.

COMMENT:

[Section II.B, page 2] right column, lines 22-24: As it seems the timed operators are not used, I suggest to avoid mentioning them. By the way, this mention without any other detail is useless.

RESPONSE:

Thanks for the suggestion. It is addressed now. Actually some of the timed operators are used in Section V.A when describing the properties we verify. We now only mention the necessary timed operators which will be used, and also add explanations when using them in Section V.A.

COMMENT:

[Page 4] line 45: Why is a period of sort `Nat`? Shouldn't it be `Counter`?

RESPONSE:

This is a good question!

In our model, a period is of sort `Nat` instead of `Counter`. A `Counter` is some kind of "dynamic". It is like a countdown timer to complete the execution of a task. However, a period is a "static" property of a task. Therefore, a period is modeled as a term of sort `Nat` instead of `Counter`.

On the other hand, a period can also be modeled as a `Counter`. Then it becomes a countdown timer to trigger an execution request of the task.

Both ways to model periods are feasible. We choose the former since its behaviors are more faithful to the real implementation we model and verify.

4 Responses to Reviewer 3

COMMENT:

This paper has been revised according to reviewers comments and suggestions, I recommend to accept it for publication after minor revisions on possible typos, such as the word "monus" on page 9 and 10.

RESPONSE:

Thanks for your pros and carefully reading. However, "monus" is not a typo but the name of the built-in minus operation defined in Real-Time Maude (as explained in Lemma A.1). We have done proof checking again to avoid other typos.