**Dear Editors and Reviewers:**

Thank you for your letter and for the reviewers’ comments concerning our manuscript entitled “A multi-material HLLC Riemann solver with both elastic and plastic waves for 1D elastic-plastic flows” (No.: CAF-D-19-00160). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and have made correction which we hope meet with approval. The main corrections in the paper and the responds to the reviewer’s comments are as flowing.

**Responds to the reviewer’s comments:**

We are very grateful for the reviewers’ positive opinions about our work and the detailed correction comments. All the comments are corrected in the Manuscript following the suggestions of the reviewers.

**Reviewer #2:**

The paper "A multi-material HLLC Riemann solver with both elastic and plastic waves for 1D elastic-plastic" flow by Li Lin and Jun-bo Cheng presents a new HLLC-type approximate Riemann solver with both elastic and plastic waves for 1D elastic-plastic flows with hypo-elastic model and von Mises yielding condition.

The previous work of Cheng published in 2016 introduced a similar HLLC Riemann solver, but only for the case of elastic waves. Therefore, the submitted manuscript presents an extended and improved version of the HLLC Riemann solver for elastic-plastic flows which is not yet available in the literature.

The paper contains a technical derivation of the constitutive relations to get the intermediate states of the Riemann problem for several configurations of the wave stencil. The constructed HLLC-type Riemann solver is used in the submitted paper in combination with the third-order WENO method to carry out a number of numerical results demonstrating the correctness of the proposed numerical scheme.

I would recommend the paper for publication in "Computers and Fluids" after addressing some minor remarks which are listed below.

**I. Expression corrections.**

1. Throughout the text, replace expressions like "maybe lead/result" with "may lead/result".

**Reply:** We have made corrections according to the Reviewer’s comments. They are “maybe lead to...” → “may lead to...” in P.1 Line.6, “maybe result in...” → “may result in...” in P.28 Line.5 and “maybe result in...” → “may result in...” in P.28 Line.21.

2. p. 1: "high order spacial construction" should be "high order spacial reconstruction".

**Reply:** It is really true as Reviewer suggested. We have corrected "high order spacial construction" → "high order spacial reconstruction" in P.1 Line 13.

3. p. 3: "non-conservations reversible system" should be "non-conservative reversible system"

**Reply:** As Reviewer suggested, we have made the correction "non-conservations reversible system" → "non-conservative reversible system" in P.3 Line.3.

4. p. 5, eq. (7): the second term in the material derivative should be $u\partial ()/\partial x$.

**Reply:** Very sorry for our incorrect writing. We have corrected “$u\partial ()/\partial t$” → “$u\partial ()/\partial x$” in P.5 Eq.(7).

5. p. 5, eq. (9): the second term in the left-hand side should be $u\partial s\_{xx}/\partial x$.

**Reply:** Very sorry for our incorrect writing. We have corrected “$u\partial s\_{xx}/\partial t$” → “$u\partial s\_{xx}/\partial x$” in P.5 Eq.(9).

6. p. 6, eq. (11): forgotten $\mu$ in the 4th line.

**Reply:** Sorry for our negligence. We have add “$\mu$” into Line.4 of Eq.(11) in P.6.

7. p. 6: avoid full abbreviation in the title of Section 3.

**Reply:** We have changed the title from “MHLLCEP” into “The MHLLCEP method” of Section 3 in P.6.

8. p. 7: "the is no materials" should be "there are no materials"

**Reply:** We have corrected "the is no materials" → "there are no materials" in P.8 Line 1.

9. p. 8: "states connected by/through the contact wave"

**Reply:** As Reviewer suggested, we have corrected “states connected the contact wave” → “states connected by contact wave” in P.8 Line 5.

10. p. 9: "relation always holds"

**Reply:** We have corrected “relation always hold” → “relation always holds” in P.9 last line.

12. p. 22: rephrase "there are two waves exist"

**Reply:** We have changed “there are two waves exist” → “two waves exist”.

13. p. 26: typo "Riemiann"

**Reply:** We have corrected “Riemiann” → “Riemann” in P.26 Line 9.

**II. Question.**

11. p. 10: how can you justify Assumption 1 about pre-evaluating the structure of the Riemann solution with only three waves? Can it potentially lead to the wrong wave structures in the final solution?

**Reply:** We assume there are three waves at first, indeed, this is not always right as there may have both elastic and plastic waves in(four to five waves cases). So if the pre-evaluating results are conflicting with Assumption 1, the result will immediately turn into other cases with more waves, and the result will be resolved with correct structures. As an example, the left pre-evaluating deviatoric stress is yielding while deviatoric stress before the wave is not, the Assumption 1 is not right in the left side, and we will resolve the states with both left elastic wave and left plastic wave. So the Assumption 1 will not lead to the wrong structures in the final solution.

14. p. 32, Table 1: why is the convergence rate decreasing in L1 norm instead of tending to the target rate of 3?

**Reply:**Reviewer #3 also not satisfied with this test, according to his suggestion, we have changed it with a manufactured exact solution to test the rate of convergence of the scheme. By the new example 5.1, we will get more reasonable results without rate decreasing.

Special thanks to you for your good comments.

**Reviewer #3**:

This paper deals with a multi-material HLLC Riemann solver for the 1D elastic-plastic equations containing both elastic and plastic waves. The novelty of the paper is in accurately accounting for more than three waves in the Riemann problem. This is achieved by extending the HLLC Riemann solver. The approach and all technical details appear to be correct and the results shown are satisfactory. The paper is suitable for publication in Computers and Fluids, subject however to minor (but compulsory) corrections which are listed below:

**I. Technical issues**

1. Page 1. The phase "Numerical results show that the presented third-order scheme is convergent" should be modified to "Numerical results suggest that the presented third-order scheme is convergent".

**Reply:** As Reviewer suggested, we have modified "Numerical results show that the presented third-order scheme is convergent" → "Numerical results suggest that the presented third-order scheme is convergent" in last line in P.1.

2.Page 3. References to HLLC should include the original HLLC paper (Toro et al, Shock Waves, 1997)

**Reply:** Considering the Reviewer’s suggestion,we have add the paper in referencence as: “[2] E. F. Toro, M. Spruce, W. Speares, Restoration of the contact surface in the hll-riemann solver, Shock waves 4 (1) (1994) 25–34. “ in P.40.

3.Page 11. Phrase: "According to the Rankine-Hugoniot conditions" could be expressed as "According to the integrated (averaged) Rankine-Hugoniot conditions".

**Reply:** We have modified phrase "According to the Rankine-Hugoniot conditions ..." → "According to the integrated Rankine-Hugoniot conditions ..." in P.11 Line 1.

4.Page 17. Choice of wave speeds could be rather diffusive and does not distinguish the type of waves. Please comment.

**Reply:** the choice of wave speeds in Page 17 is only used for a three-waves structure, which is also used in the classical HLLC method as well. When there are both elastic and plastic shock waves in one side, the elastic shock wave is solved exactly. So the wave speeds will not influence the distinguishment of the wave types. For rarefaction waves, the shock wave assumption in HLLC-type methods will cause diffusion, but we still can distinguish the elastic and plastic waves well as they are simulated with different shock wave types with different wave speeds.

Page 31. I am not happy with the test problem for smooth solutions. I suggest the authors use a manufactured exact solution to test the rate of convergence of the scheme.

**Reply:** As suggested, we have change example 5.1 with a manufactured exact solution. And thanks to the Reviewer, this truly can improve the results.

II. Language issues

Generally the paper is well written but there are some language errors and the authors are encouraged to carefully revise the full paper before resubmitting. Below I list some examples only.

Page 1. This assumption maybe lead to big errors. Change to: This assumption may lead to big errors.

**Reply:** We have changed “ This assumption maybe lead..” → “This assumption may lead to...” in P.1 Line 6.

Page 2. The phrase "Firstly, it's no necessary" should be changes to "Firstly, it is not necessary"

**Reply:** We have modified "Firstly, it's no necessary ..." → "Firstly, it is not necessary …" in P.2 Line 17.

Page 3. The phrase " two cases need to be taken" Change to "two cases that need to be taken"

**Reply:** We have changed the phrase" two cases need to be taken …" → "two cases that need to be taken …" in P.3 Line 19.

Page 3. Introduce definitive article "the": "interface are same", change to "interface are the same"

**Reply:** We have modified “interface are same” → “interface are the same” in P.3 Line 21.

Page 5. Phrase "energy is gotten from" could be changed to "energy is obtained from"

**Reply:** As suggested, we have changed"energy is gotten from" → "energy is obtained from" in P.5 Lines 11-12.

Special thanks to you for your good comments.