**Reply of the reviewers’ 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".

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

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

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

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

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

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

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

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

10. p. 9: "relation always holds"

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

13. p. 26: typo "Riemiann"

**Reply:**

All those expression errors are modified.

**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 has period yielding, 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.

**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:**Modified.

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

**Reply:** The paper is referenced 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.*

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

**Reply:**modified as suggested.

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 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 diffusions, 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 aa 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.

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

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

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

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

**Reply:** We have modified all the issues listed above, and we have also carefully revised the full paper some times.