Reviewer #2: This paper discusses the LCS Tool by setting up its foundation in theory, discussing the algorithmic approach taken to implement it, and then

demonstrating it on three problems (one obtained from observations of a

real system, and two obtained from models). The tool is a MATLAB library

composed of implementations of numerous techniques from the literature.

The paper does a good job describing the theoretical basis and numerical

methods in the context of these past published works, and citing them to

explain why choices were made in their implementation. The paper is well

organized, with each section addressing each of the three classes of

LCS (hyperbolic, elliptic, parabolic) clearly. It reads well and seems to

leave no dangling questions that aren't answered either in the paper or via

one or more references.

I found only minor problems in the presentation and one question about

memory usage that are very simple to fix and should require a very minor revision.

1. Page 5 (line 135). point should be plural: "... about 500 grid points along the ..."

2. In the equation at the bottom of page 5, it looks like a subscript was

written as a superscript instead. Bottom left component is written as:

x\_2(t;t\_0,x\_0+\delta x\_1) - x^2(t;t\_0,x\_0-\delta x\_1)

The second part of that seems like it should read:

x\_2(t;t\_0,x\_0+\delta x\_1) - x\_2(t;t\_0,x\_0-\delta x\_1)

3. Page 6. The consequences of vectorization on memory usage are mentioned,

but no indication is given of how memory usage relates to resolution. It

would be useful if some concrete data or estimate was provided. For example,

in Figure 5 the result of the tool is shown for three resolutions - how did

the memory usage change as the resolution was increased?

4. Be consistent in accent usage for Poincar\'{e}. As far as I could

tell, the accent was used in only two places (page 8, line 192 and

206) and nowhere else. I'd recommend either using the accent

everywhere, or dropping it everywhere.

5. Figure 3. Indicate what "s" and "P(s)" are in the caption to the figure,

or as part of the axis labels. Their meaning can be inferred from the text,

but it is typically nice to have such information accompanying the figure

itself.

6. The white dots in the figures that indicate \lambda maxima are hard to see,

and I don't believe that their presence or meaning is called out until the

caption for Figure 8 even though they appear in Figure 6 and 7. While it

may be challenging to make them stand out more in the figures, it would

be nice if, when they are present, they are explained in the text or figure

captions like they are for Figure 8.

7. Page 20, like 408. "a multiple of a the eddy" -- this reads awkwardly.

I assume that the second "a" is a typo.

8. Minor issue: in some of the source code readings, code is split

awkwardly across lines in places, such as a semicolon on its own line on

page 21 and an array index on the next line as the array that it is

indexing on page 25 (line 581, source line 50).

The code works well too - I downloaded it and tried a couple of the demos.

Reviewer #3: This article presents a computational platform for solving Lagrangian Coherent Structures. While it is technically rigorous and the application scenarios, with examples of double gyre, bickley jet and ocean velocity data, are well chosen, the comments are focused on the generalization of the computational paradigm in order to match the claim of "platform" as in the title.

1. Between the three applications, there should be description about linking them in terms of generic APIs (application programming interface) or common code style. It is good to have code in the paper but it doesn't seem to be straightforward for a reader to find out how this simplifies the effort for coding that from the scratch (instead of using the platform). That part should actually be highlighted as a key point for judging the merit to the community. So, it would be very useful to pinpoint the generics with a flowchart (e.g. it always starts from input parameters, velocity definition and then LCS parameters, and how you finally call only 1-2 functions for the core solving routine), and your Matlab code there can further demonstrate the paradigm.

2. As for a platform, efficiency is also a matter in consideration. Performance degradation is not expected as a cost of generalized computational paradigm. That part should be at least mentioned along with the applications to make the article technically more sound.

3. The comparison with other publicly available LCS-detection software should include more details. In Section 1 of the article, it currently contains a very high-level summarization of LCS tool being "all-purpose numerical engine". That part should be re-visited and become more concrete.

4. This is a minor one, but while the LCS tool is supposed to be publicly available, it would be better to add some documentation within the github repository to show some reference to the APIs and how the user may start to run a his/her own application.

5. The "Highlights" part of the article probably needs to be re-visited too. Currently it is in a way so simple that doesn't grasp the core contribution of the article.

Reviewer #4: The paper presents a quite extensive review of the computational engine to simulate

Lagrangian coherent structures. The contents are well organized with well illustrated examples.

The literature is relatively extensive, so the paper can be accepted.

Minor suggestions:

Please make sure these codes are downloadable once the paper is published.

Reviewer #5: The manuscript titled "LCS Tool: A Computational Platform for Lagrangian Coherent Structures" is a well-written paper containing the steps and numerical methods used by new developed LCS Tool. My suggestion is the article be accepted on the condition of minor revisions.

However the manuscript, in its present form, contains several weaknesses. Adequate revisions to the following points should be undertaken in order to justify recommendation for publication.

1. In abstract and introduction, the objective and contribution of the paper are not clear, and several points need to be clarified further.

2. For readers to quickly catch the contribution in this work, it would be better to highlight major difficulties and challenges, and your original achievements to overcome them, in a clearer way in abstract and introduction.

3. The manuscript should be carefully formatted, e.g. p16, line9, the footer of List 2.

4. There are too much source code in the main content such as Listing 3, 4, 5. It could be arranged as the appendix at the end.

5. Please provide information regarding practical applications of this algorithmic software tool.

6. The functionality and taxonomy of the proposed LCS tool should be introduced for overview understanding of the tool.

By conclusion, this paper is related with the topic of JOCS and acceptance should be considered after minor revision.