Software Lab Project #11
Development of the failure criteria for composites

Group Meeting #5

Date: Wednesday 07.08.2019 (5:30 to 6:30 PM)
Location: Chair of Computational Mechanics (Room: N2620)
In attendance: Ani Khaloian, Michael Richter (Project supervisors)
Ammar Khallouf, Panagiotis Gavallas, Yasuyuki Shimizu (Group members)

1. Current progress

- The group has completed the implementation of the Maximum Stress criterion, along with the Hashin and Tsai-Wu criteria. Current damage models include instant and recursive damage.

- The supervisors stressed the importance of each member presenting their work, so that it is clear that the tasks are equally distributed among them.

- The members agreed upon which tasks to undertake and to present their findings in the next meeting.

2. Future plans

- Each member agreed to implement additional failure criteria. Moreover, test cases have to be found as a means of verifying the implementation.

In particular:

- Mr. Shimizu will implement the Maximum Strain and Hoffman criteria
- Mr. Gavallas will work on Puck's criterion
- Mr. Khallouf will complete the Hashin damage criteria and extend UMAT to VUMAT for explicit analysis

- The tasks have to be completed by the next meeting, while feedback has to be sent to the supervisors around mid September.

- Additional objectives include the implementation of more complex damage models, such as energy-based models, and methods for increasing numerical stability, such as viscous regularization.

- The members agreed upon the end goal of project being to provide the user with a number of failure criteria to choose from, according to the material being modelled.

3. Presentation of results

- The members showed some results from their current failure model implementations in Abaqus.

- The supervisors noted that different specimens have to be used depending on the material, for example the dog bone specimen is best suited for materials with plasticity.

- Mr. Khallouf provided an excel sheet which shows how recursive and instant damage works

- Also, the failure criteria implemented so far were discussed and the literature which served as a guide to their implementation was shown to the supervisors.

4. Remarks on presentations

Lastly some remarks on previous presentations and advice on the final once were given by the supervisors:

- In general, the introduction part of the presentation has to be made shorter for each presentation.
- It is important that the members clarify what the user has to input for each failure method to work.

5. Next Meeting

- The next meeting with the supervisors is scheduled at October 16th, 2019 at 17:30 (Room N2620)