

Name:

Final Project

Due 5 May 2019

Choose either a real-life problem where multi-scale modeling would be beneficial. For this problem, perform the following tasks:

1. A simplified model which can be solved using an analytical method (Eshelby)
2. A parametric finite element model (validate to Eshelby, then scale to correct volume fraction)
3. Some micromechanics software analysis (SwiftComp, CRAFT, MAC/GMC, etc.)

In your report you should assume that the reader is already familiar with Finite Elements and the Eshelby method. The reader may not, however, be familiar with the specific micromechanics tool you are using. You should describe the method that your chosen software is using (i.e. Variational Asymptotic Method for SwiftComp, Fourier Transforms for CRAFT, Method of Cells for MAC/GMC. etc.) Make some conclusions about the software you are using:

- Have you demonstrated that the results from this method are correct?
- What advantages does it have over analytic methods and finite elements?
- Are there cases where you would expect your software to have difficulty?

Remember that this project is in place of a final exam. While choosing a simple geometry may be appropriate, full credit will only be given when a thorough understanding of course material has been demonstrated. Plots and figures are generally helpful in understanding the overall results. Reports should be no longer than 20 pages.

Projects will be graded on the following rubric

- Analytic Model - 25%
- Finite Element Analysis - 25%
- Micromechanics Software - 25%
- Conclusion - 15%
- General Presentation - 10%