Homework 1, Due Friday, October 19

Math 270A:Introduction to Scientific Computing

You have to write this code in C++. You can use my basic algebra classes to help you do this if you want, but you are not required to. If you do not use my classes, I recommend that you at least write MATRIX_3X3 and MATRIX_2X2 classes to help you. My handout code is in the file ALGEBRA.h on the course webpage (under week 1). If you do decide to use my code, you just need to write the member functions (of my MATRIX_3X3 and MATRIX_2X2 classes) SVD, Delta_Sigma and Delta_SVD.

1. Write functions that compute the deformation gradient from two input triangles (2D) and tetrahedra (3D).
2. Write a functions that compute the SVD of the deformation gradient for 2D and 3D.
3. Write functions that compute $\delta\mathbf{U}, \delta\mathbf{V}$, and $\delta\mathbf{\Sigma}$ in 2D and 3D.