This is one example for 2D elasticity

**How to complie**

The lattice model contains two parts of energy, one is two pair spring, the other is related to area or volume change. The spring model can be directly fund in the lammps, so we need to implement the area and volume parts.

Put improper\_neohookean.cpp and improper\_neohookean.h in the folder “src”. The newest version may change a little bit. You can just to find the folder that contains other improper\_XX.cpp files.

“improper\_octa.cpp” and “improper\_octa.h” are code to calculate the volumetric energy of a linear brick element (8 nodes) in the lattice model. 4 nodes are provided in the data structure of the improper, the other 4 nodes are provided in the improper coefficient.

These two files are based on older version of LAMMPS. The newest one may change a little, but it should not be very difficult to update by comparing the exsiting codes in the LAMMPS package

**How to run the simulation**

mpirun -n 72 lammps -in in.neohookean\_bilayer\_com\_imp

The exact name of “lammps” will depend on the compile of LAMMPS

**Matlab code**

“create\_lattice\_neohookean\_improper\_bilayer.m”

“write\_lammps\_bond\_improper.m”

These two codes are creating a geometry model of a bi-layer neo-Hookean structures and generating the data file for LAMMPS

You can definitely write some code and even GUI to create the model and generate the data for LAMMPS simulations.