1. The plots related to rigid particles and flexible boundaries use FEM-DEM model conducted in commercial software Abaqus, and the plots related to hydrogel and flexible boundaries use FEM with user defined subroutine file (details seen in .for file) conducted in commercial software Abaqus.
2. Figure 3.19 to Figure 3.26 are plots by FEM-DEM model using different structural parameters including, particle size, length, and materials stiffness.
3. Figure 3.27 to Figure 3.34 are plots by FEM model using different input parameters.
4. Among all the plots, the **x values** are the input changed in the software and the **y values** are the results by simulations.
5. The procedures of how to run .inp file to get the data is shown in READ ME file, the FEM-DEM model is shown in READ ME\_FD file and the FEM model relating to subroutine file is shown in READ ME\_F file.