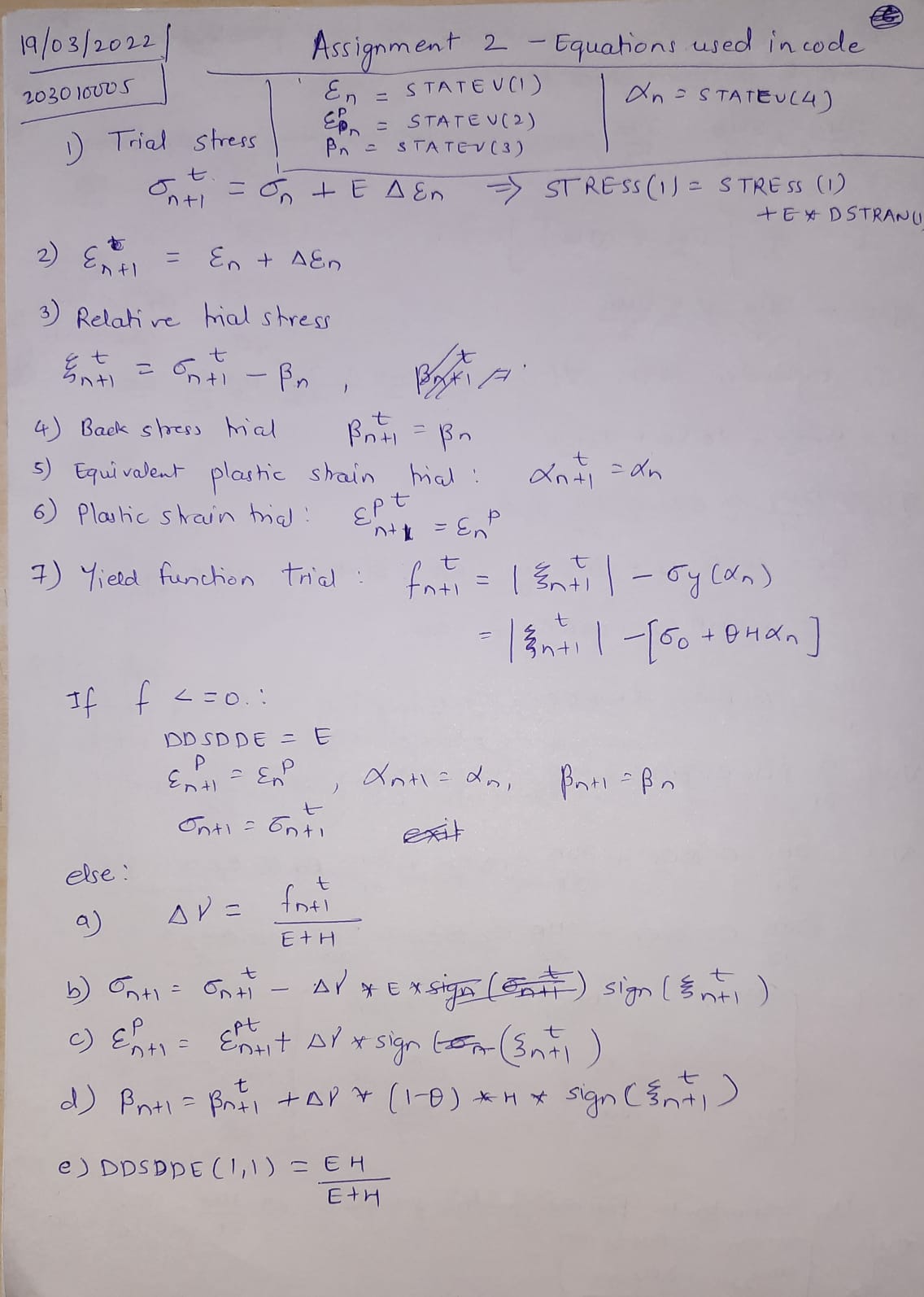
ME 759: Nonlinear FEM

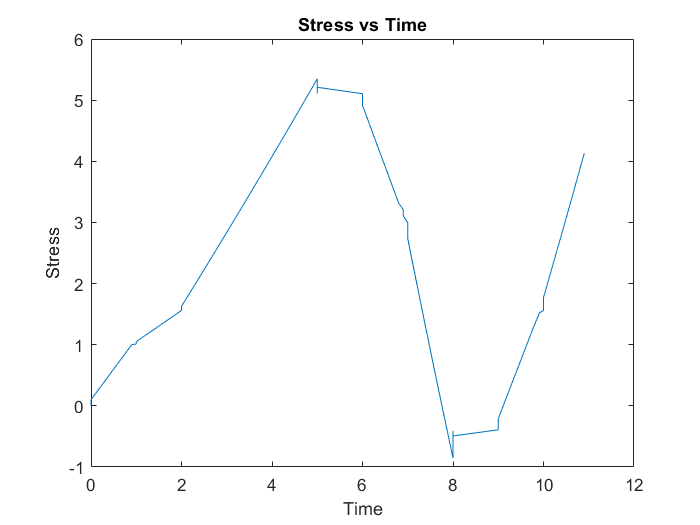
Assignment 2: 1-D Elastoplasticity

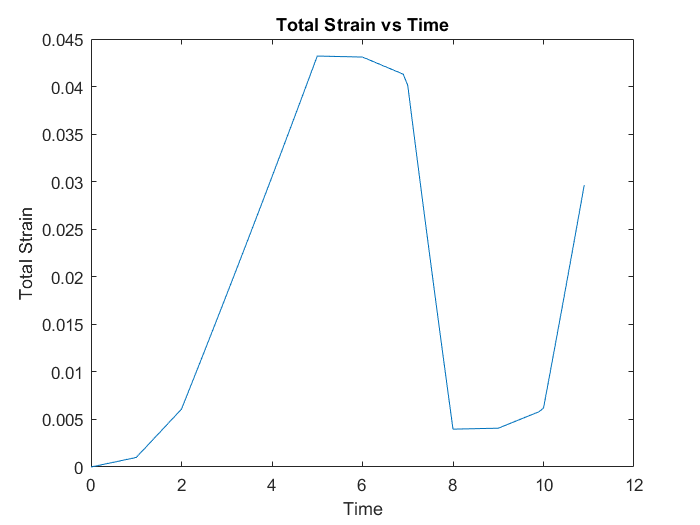
# Equations used for coding

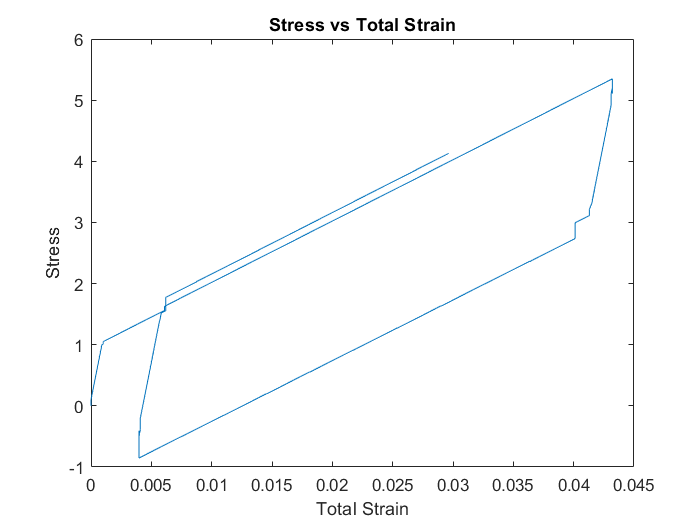


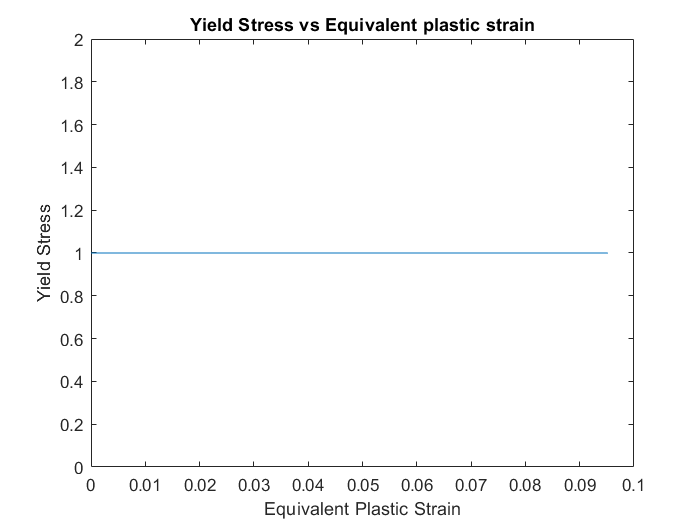
# Part a

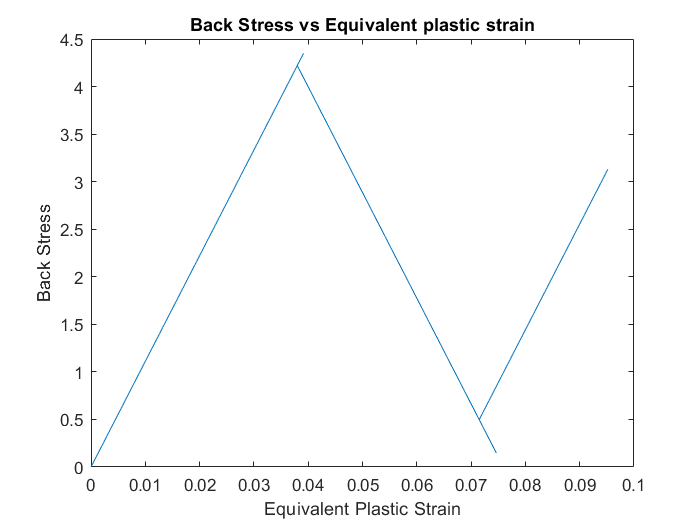
## Theta = 0.0 (Pure linear kinematic hardening)

`

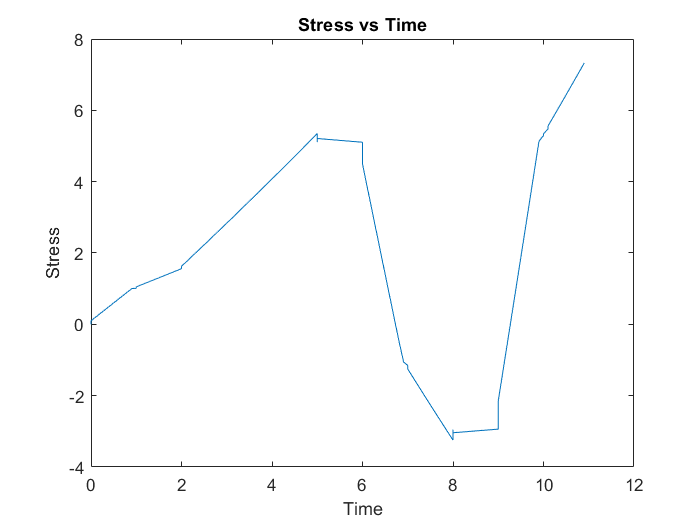


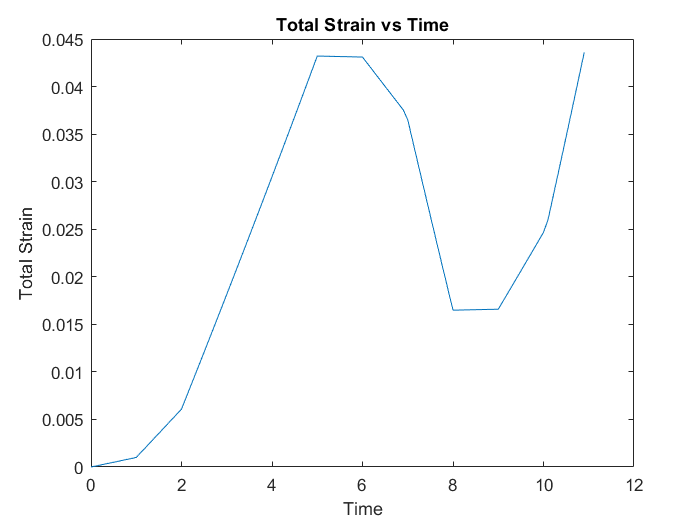


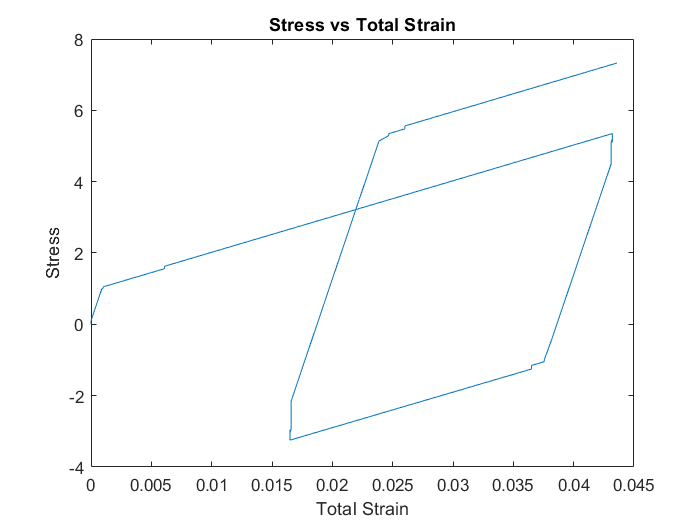


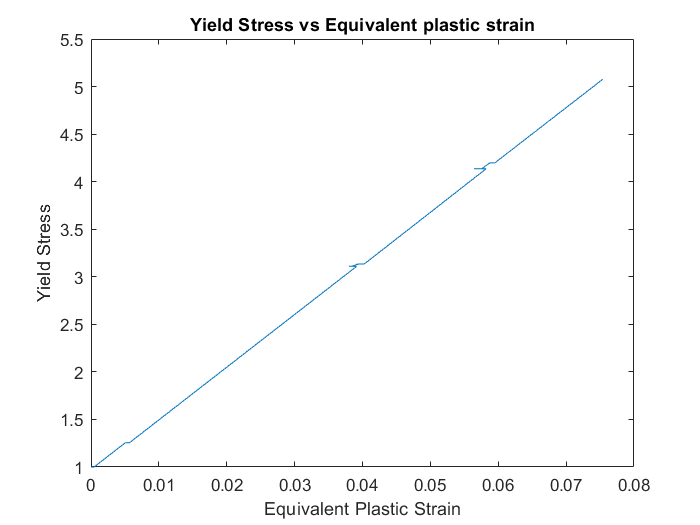


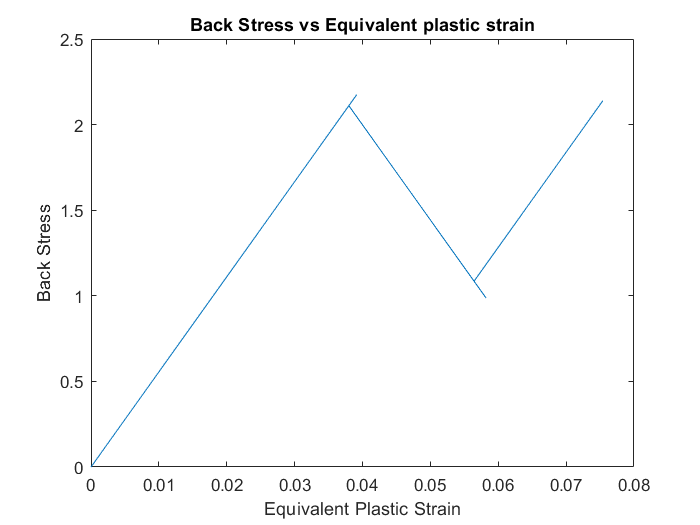
## Theta = 0.5 (Combined linear isotropic-kinematic hardening)



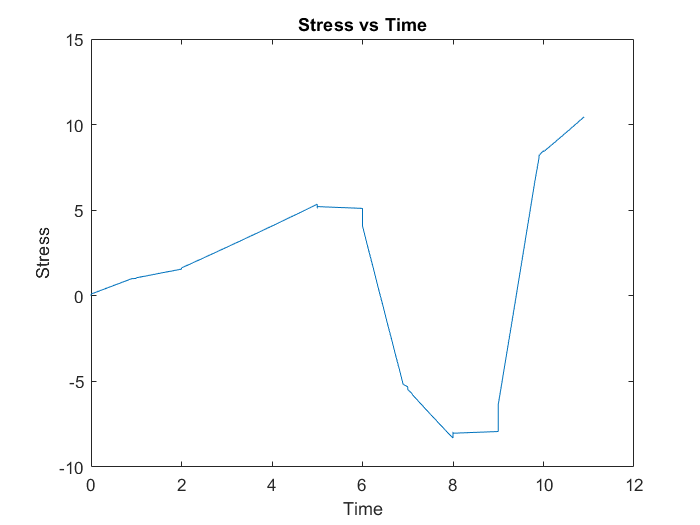


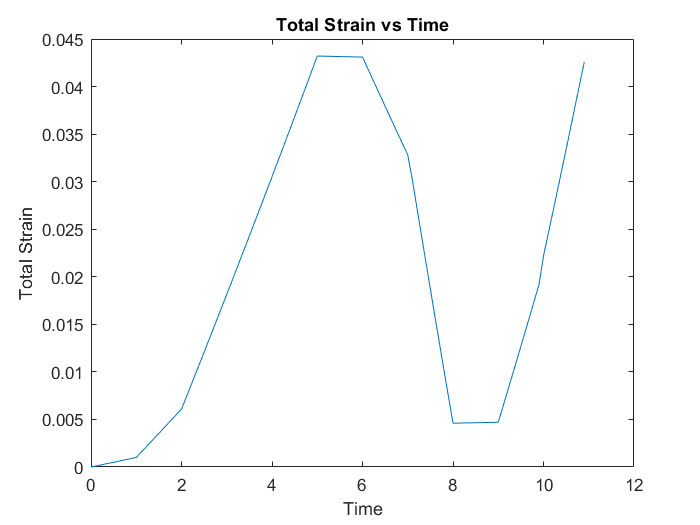


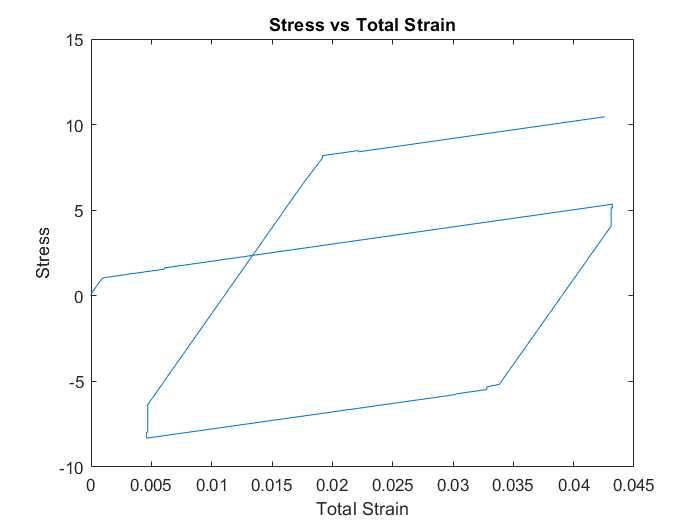


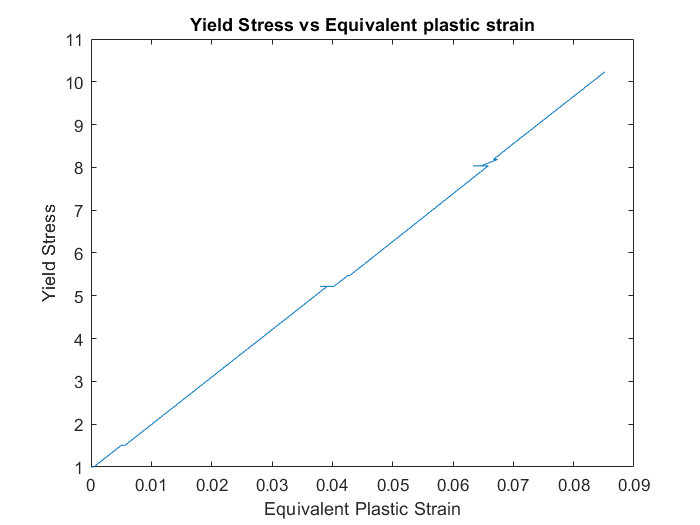


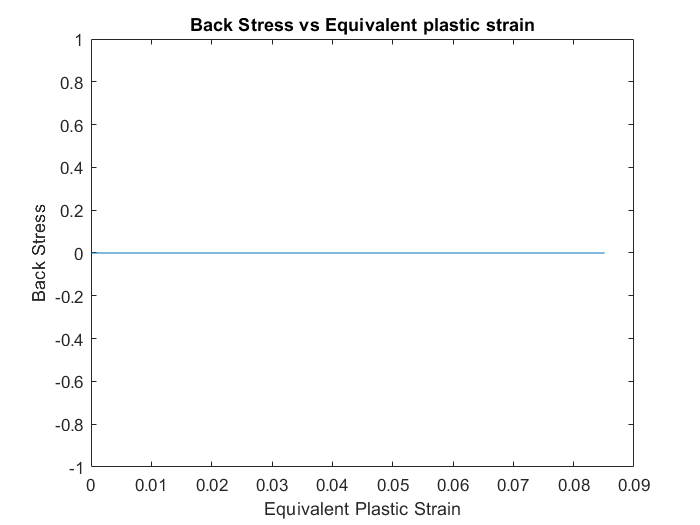
## Theta = 1.0 (Pure linear isotropic hardening)











### Observations:

We get zero back stress as for pure isotropic hardening, there is not back stress term in equations.

# Part b

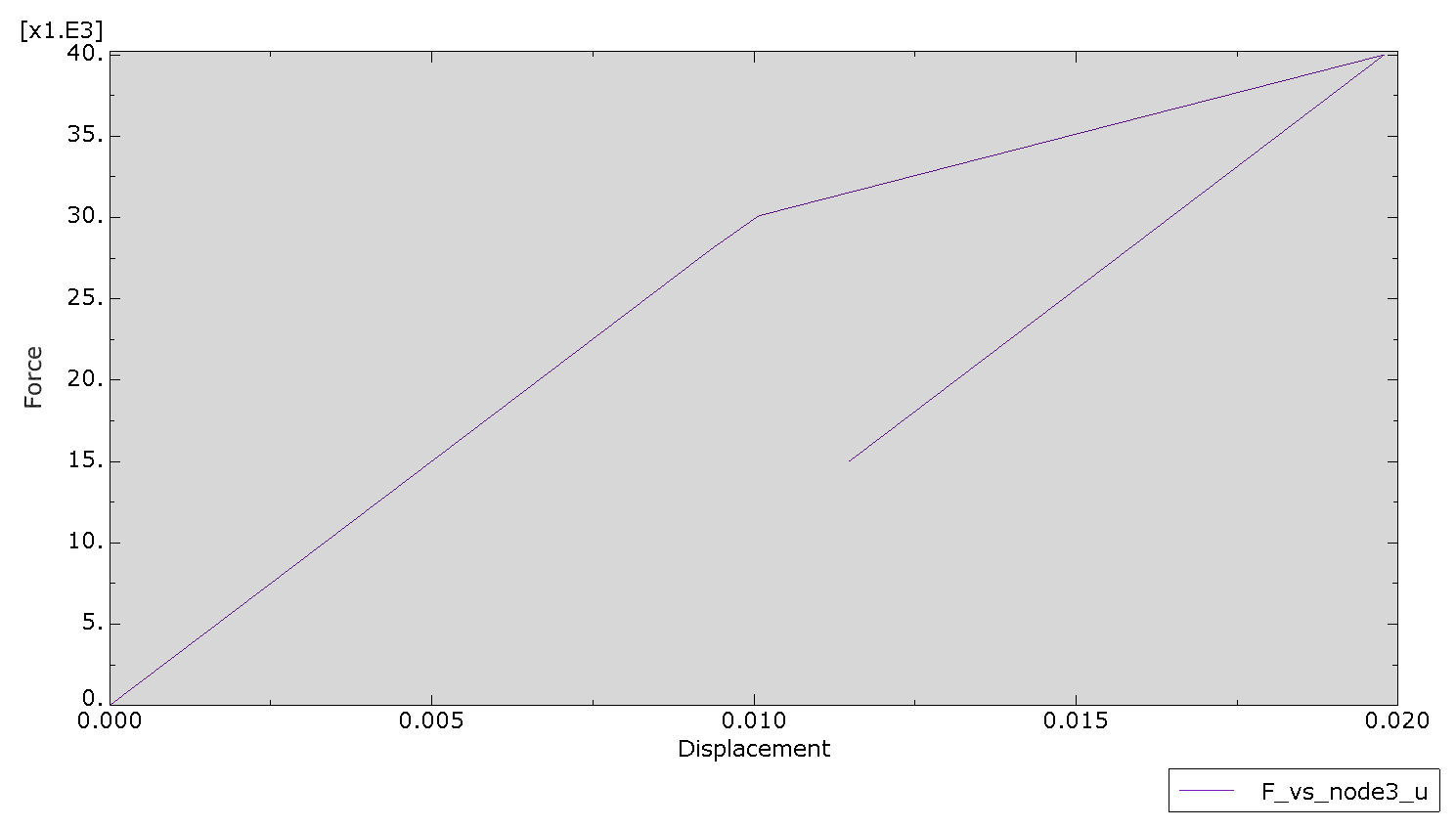


Fig. 1 Force F vs. displacement u of node 3

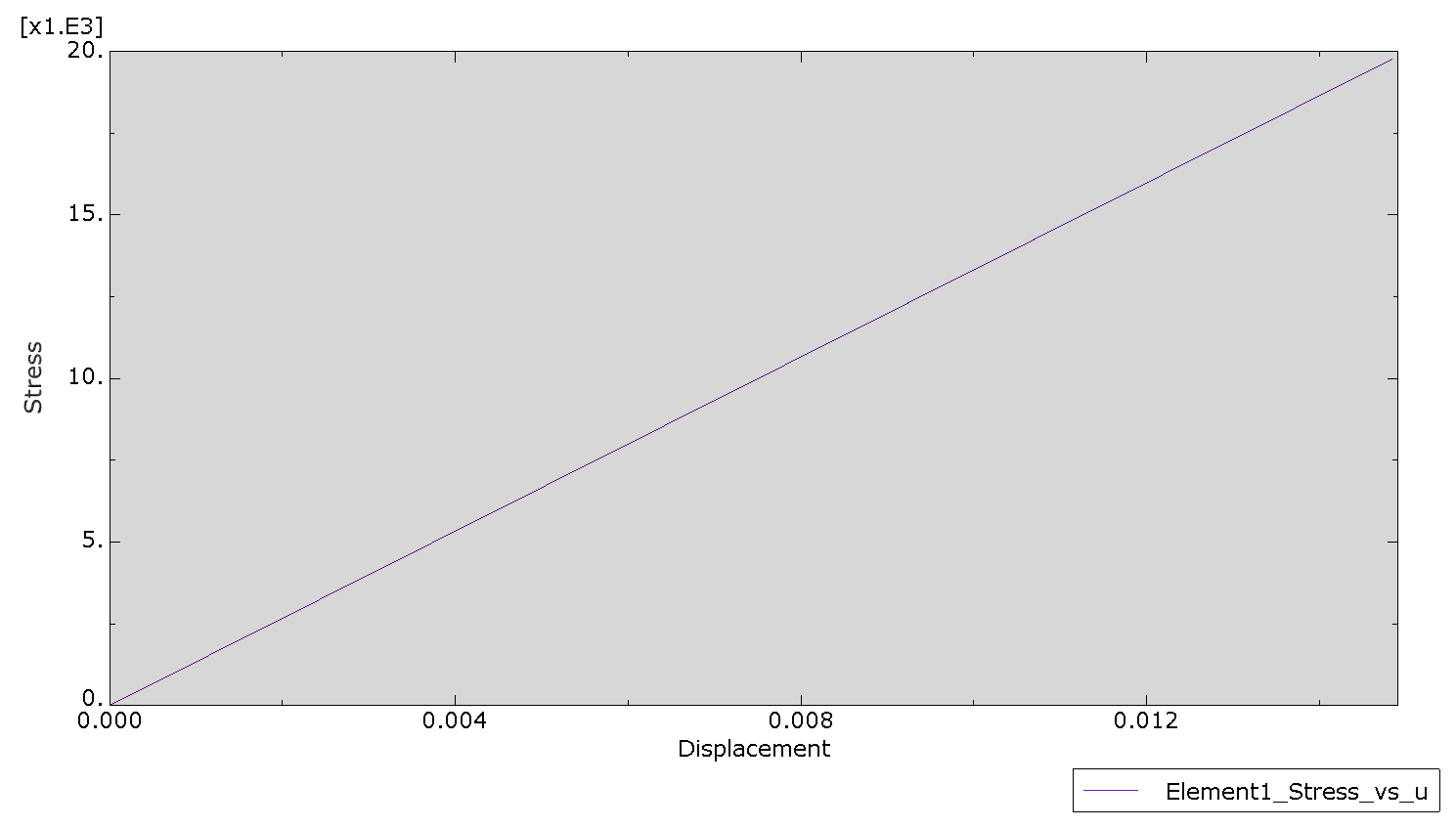


Fig. 2 Stress in elements 1 vs displacement u

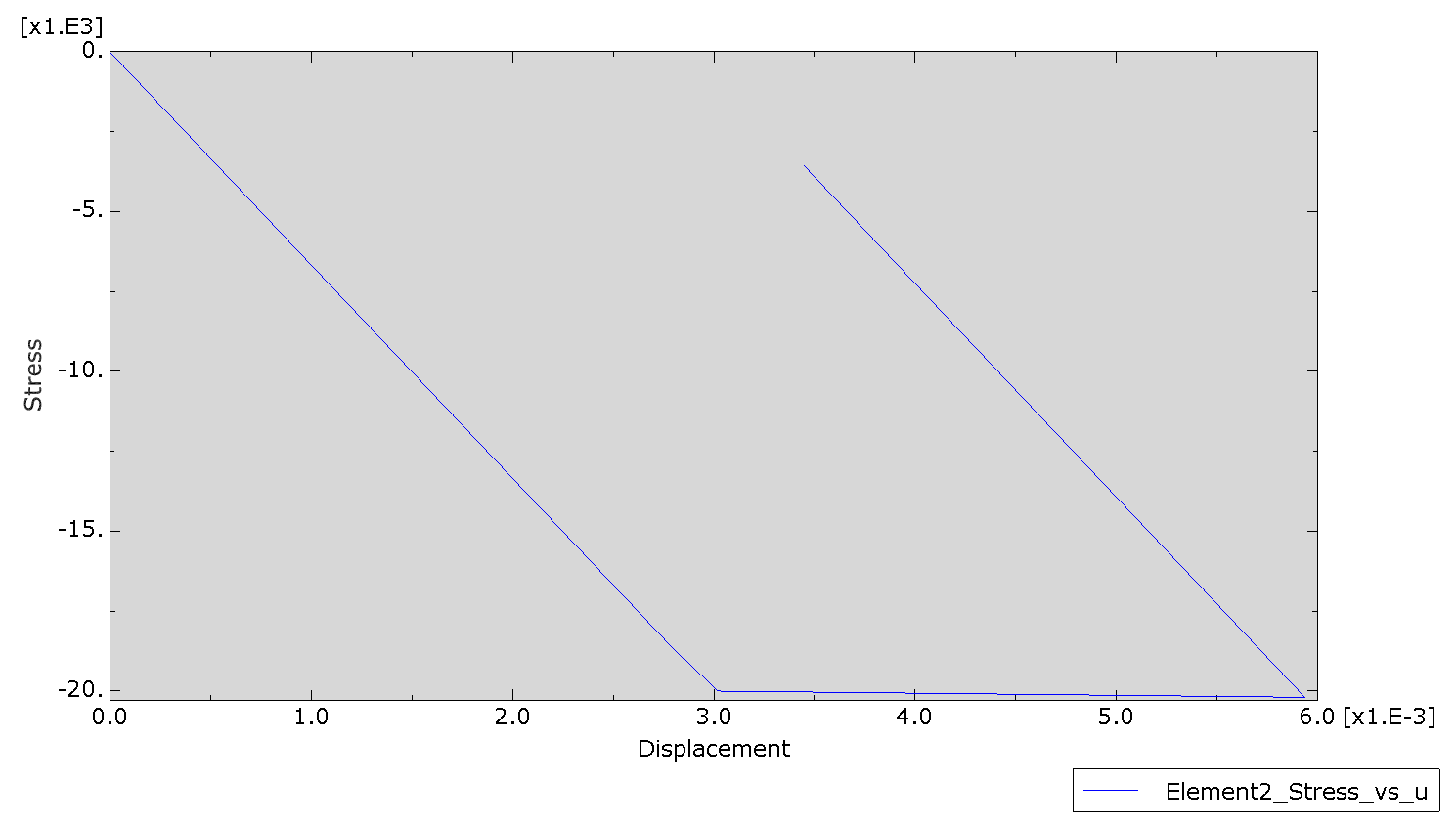


Fig. 3 Stress in elements 2 vs displacement u

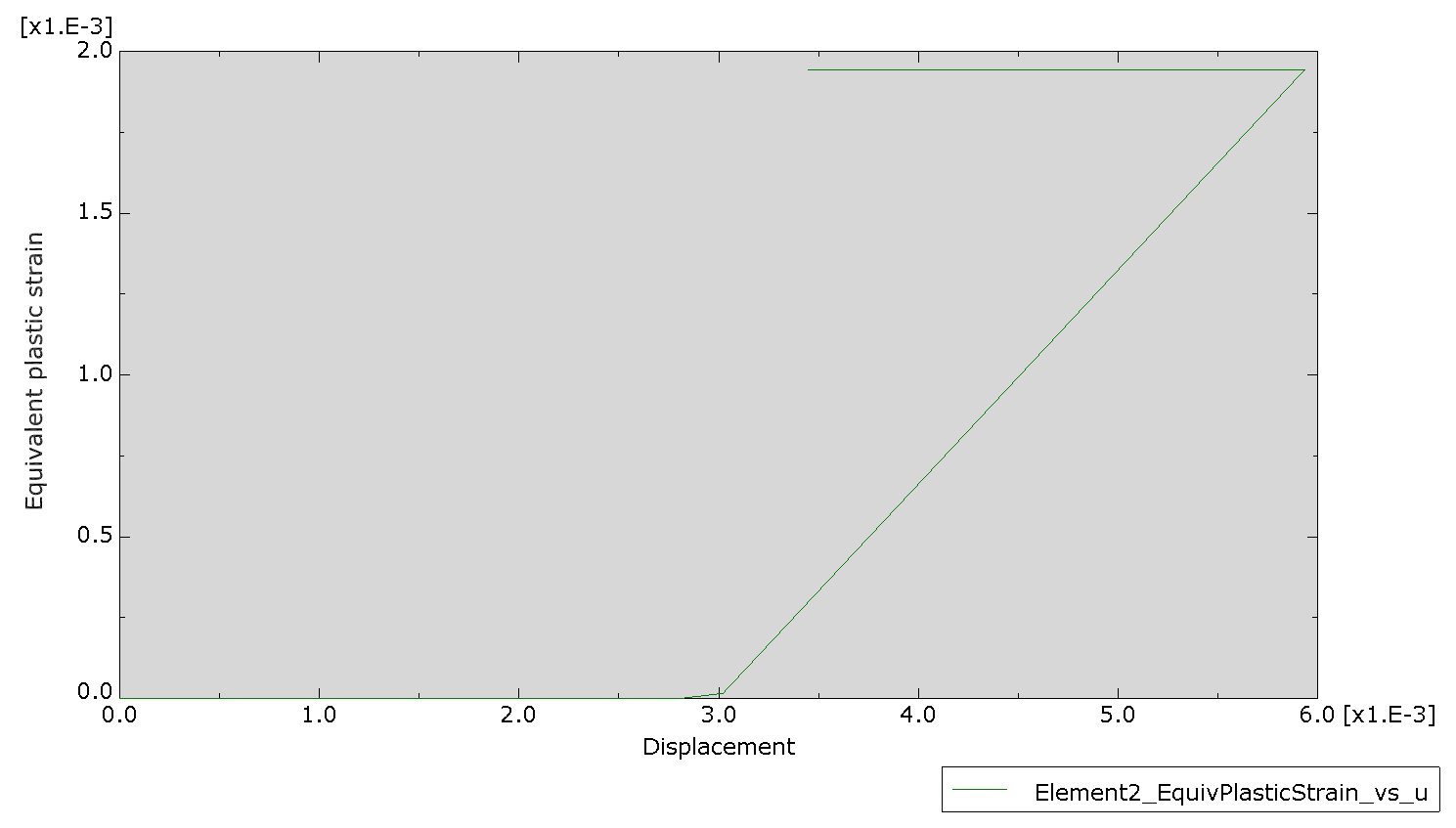


Fig. 4 Equivalent plastic strain vs displacement u in element 2