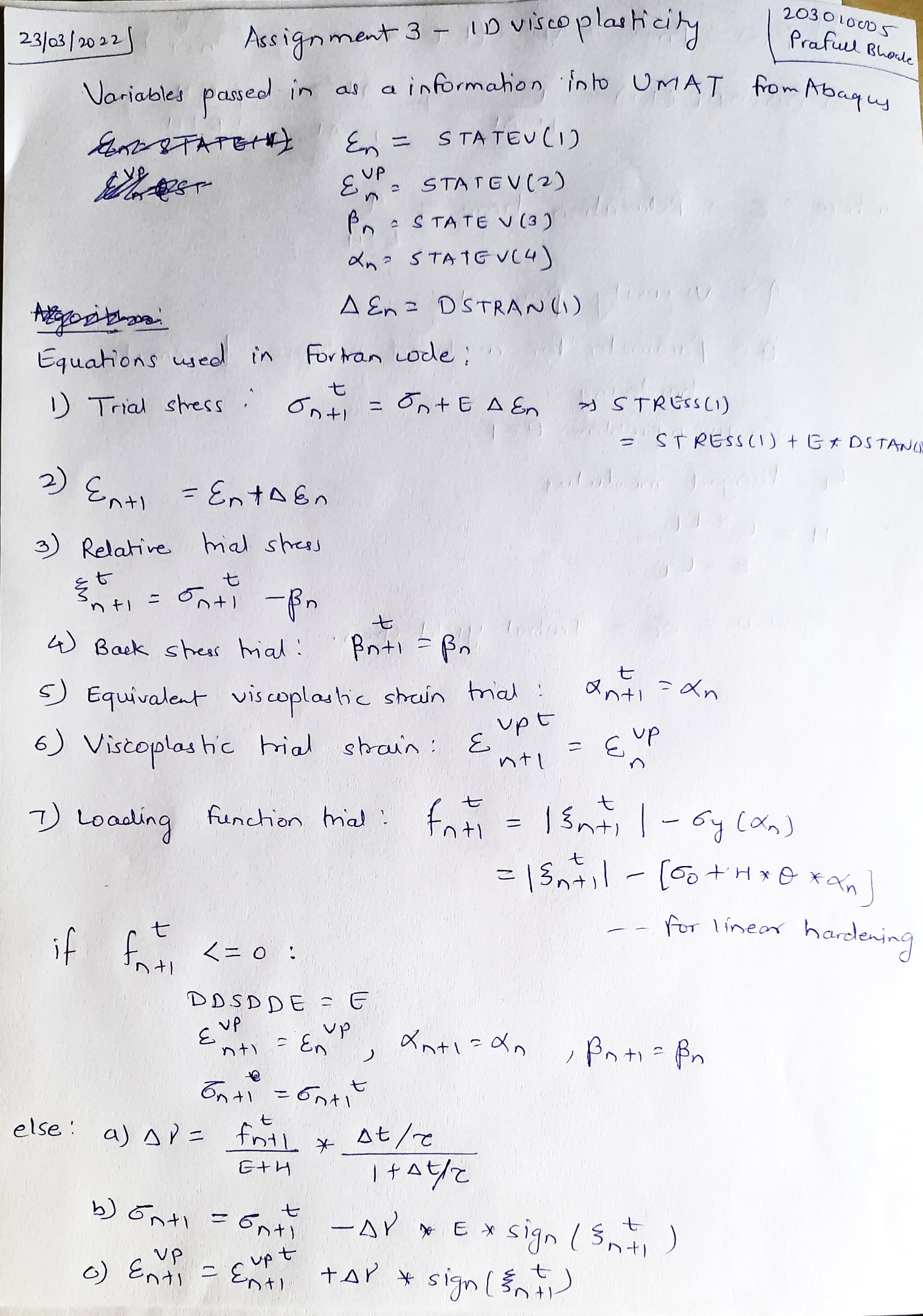
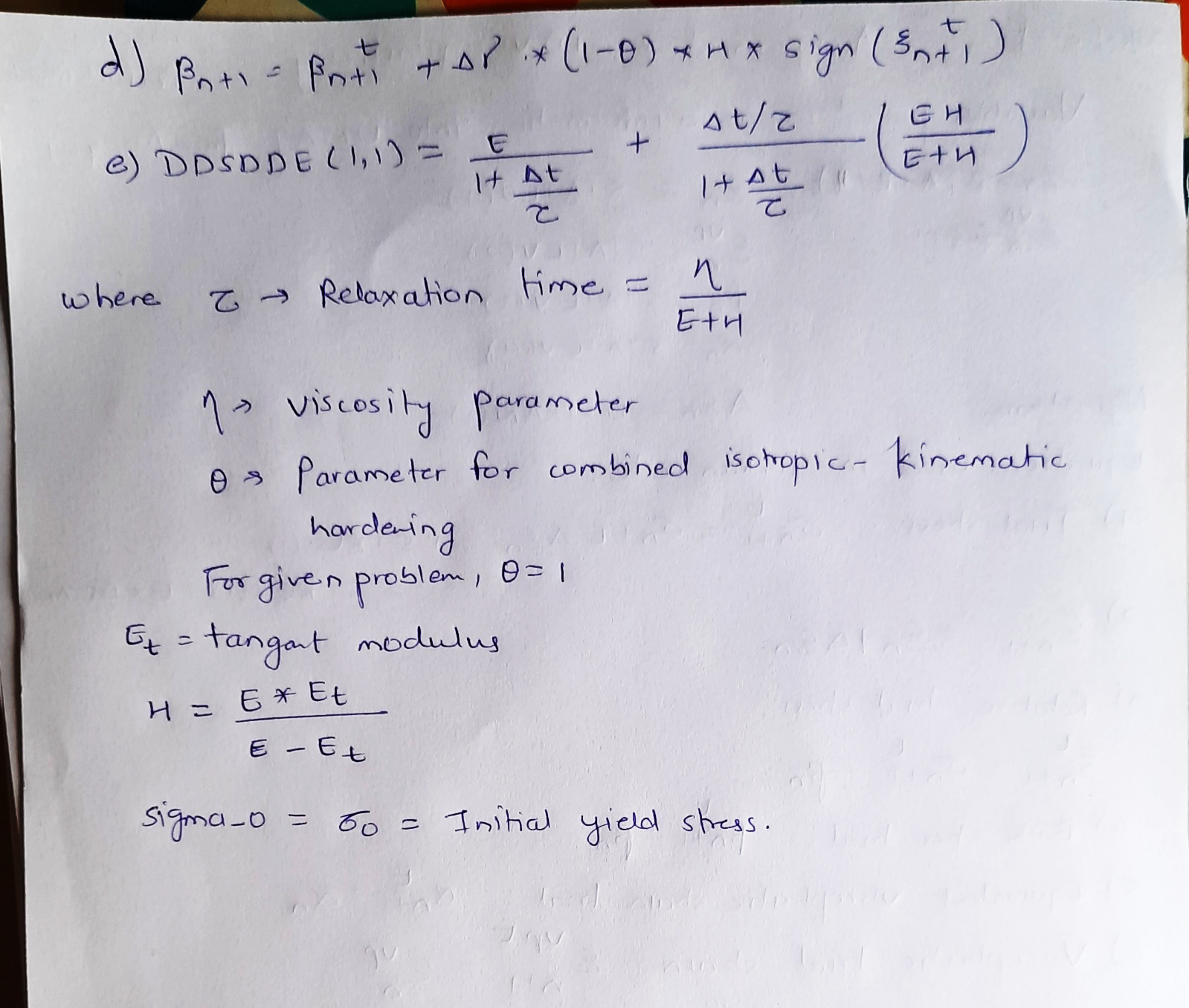
ME 759: Nonlinear FEM

Assignment 3: 1-D Elasto-viscoplasticity

# Equations used for coding

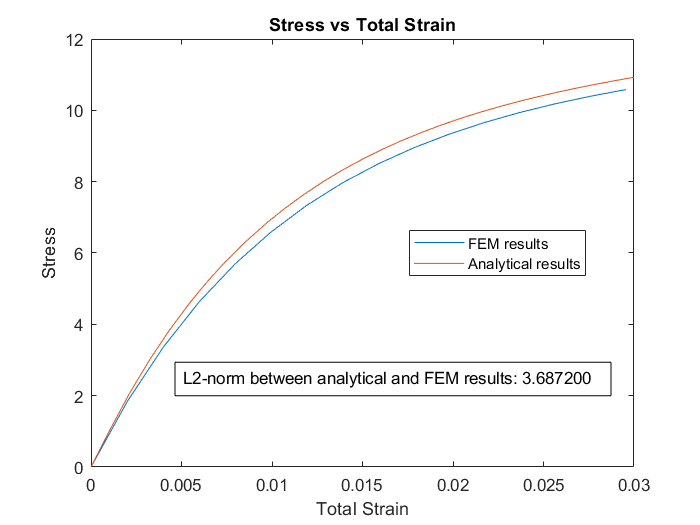


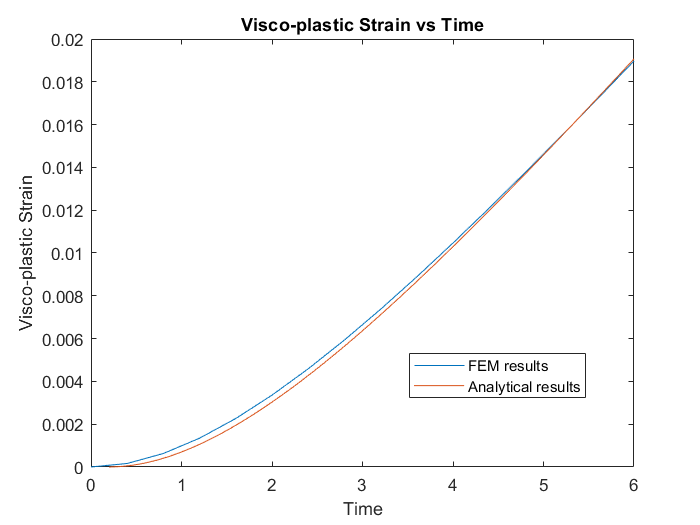


# t = t1

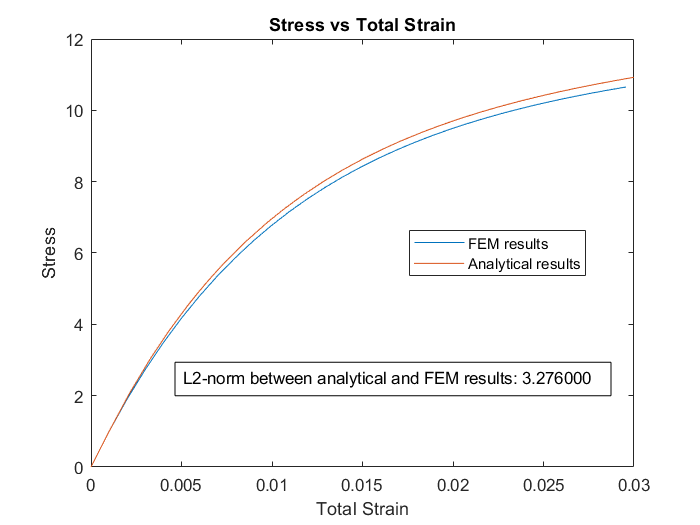
## t1 = 6

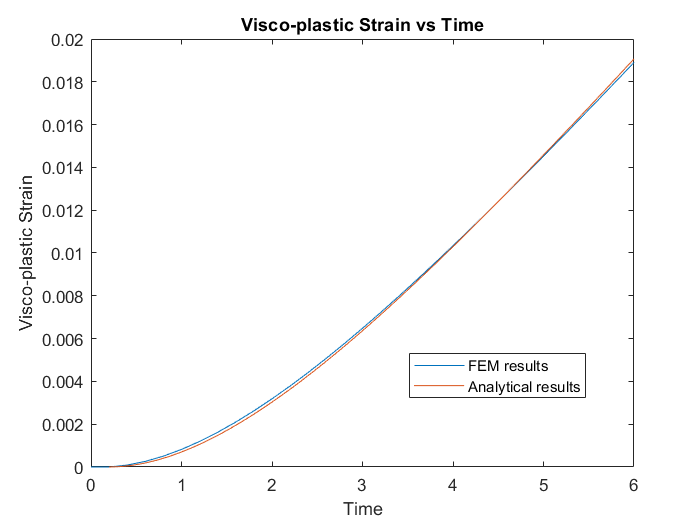
### c = 0.005,



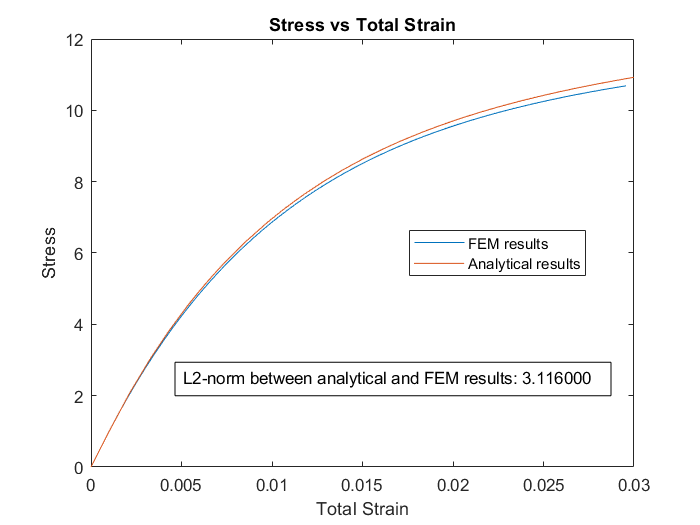


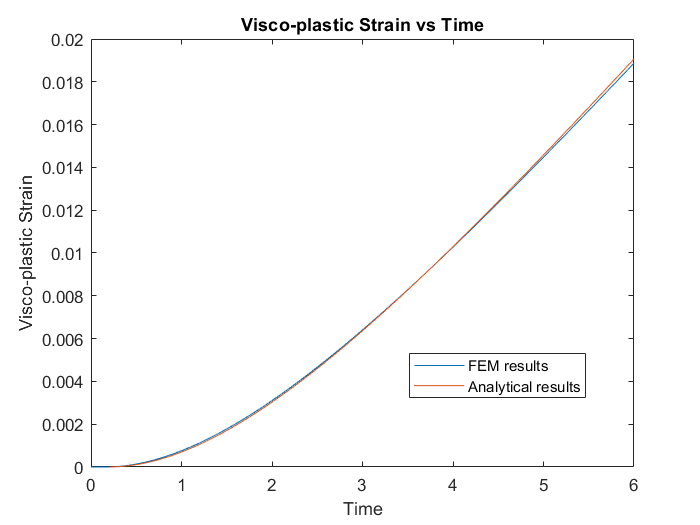
### c = 0.005,





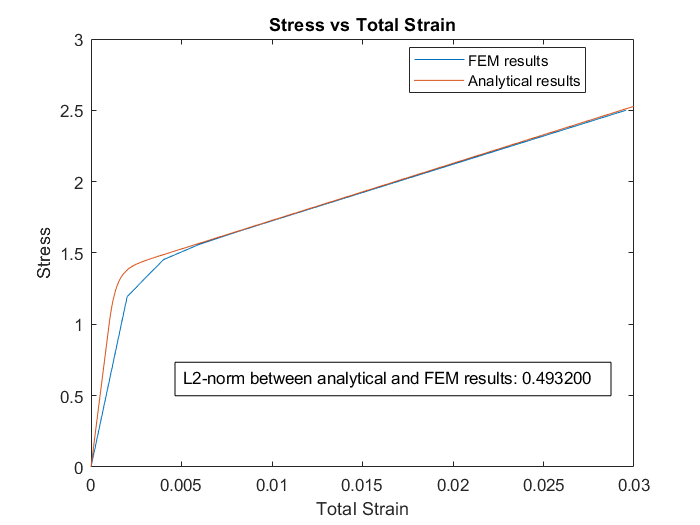
### c = 0.005,

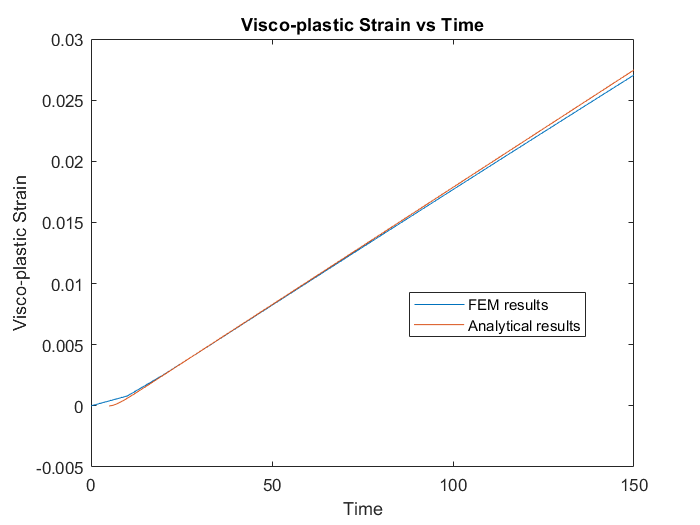




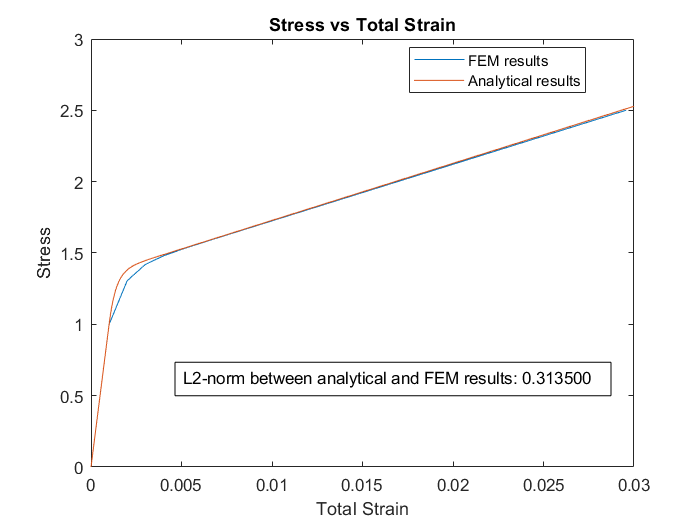
## t1 = 150

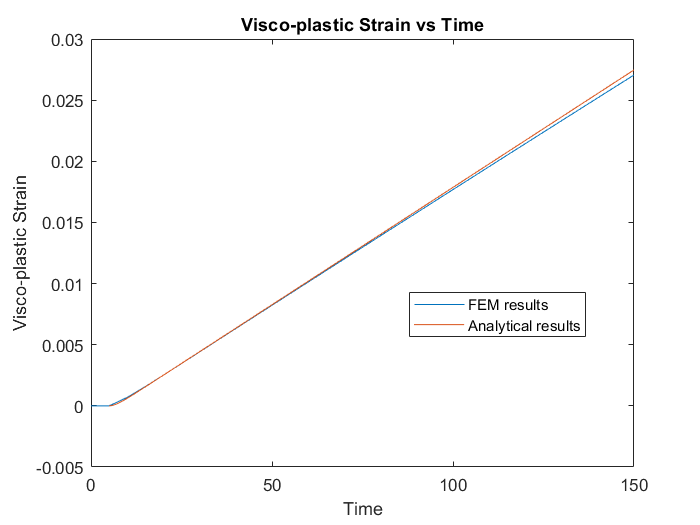
### c = 0.0002,



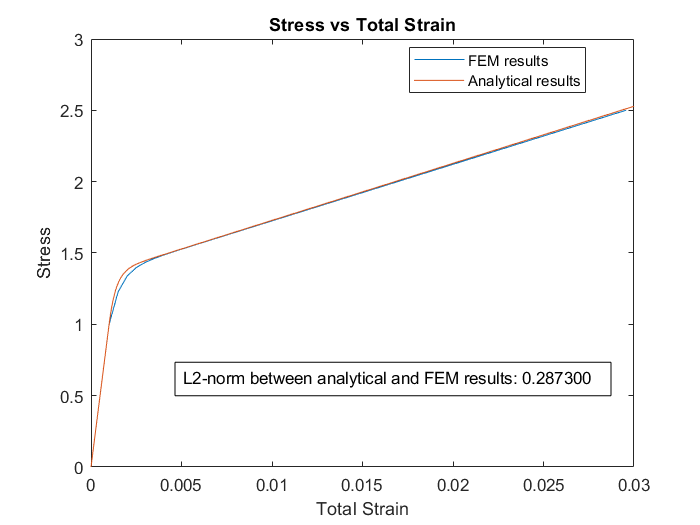


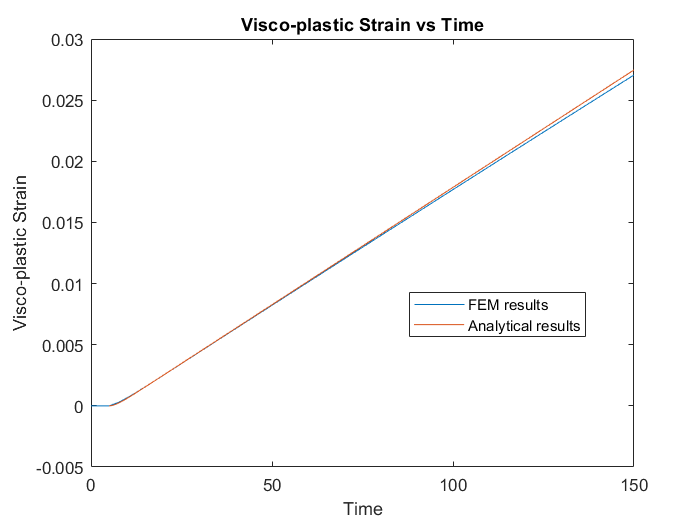
### c = 0.0002,





### c = 0.0002,





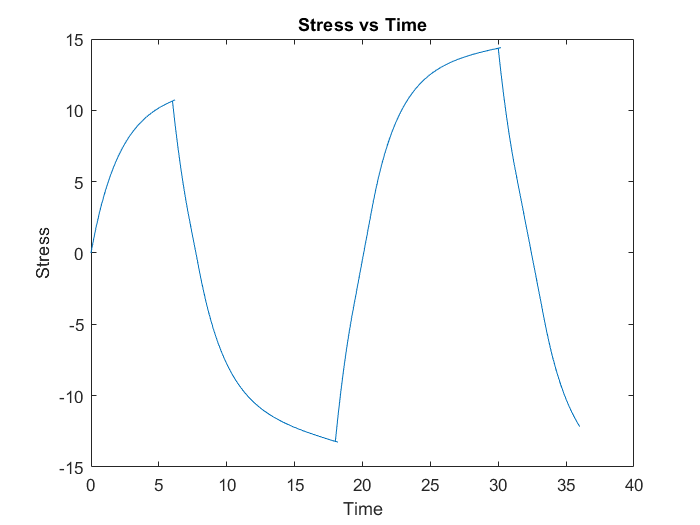
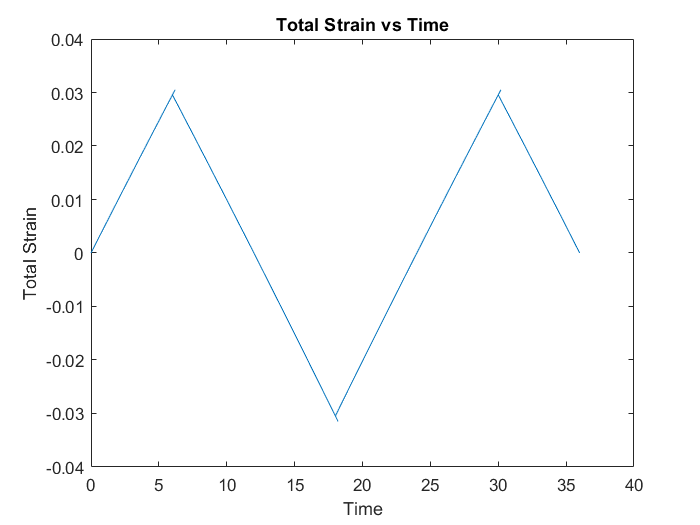
## Observations:

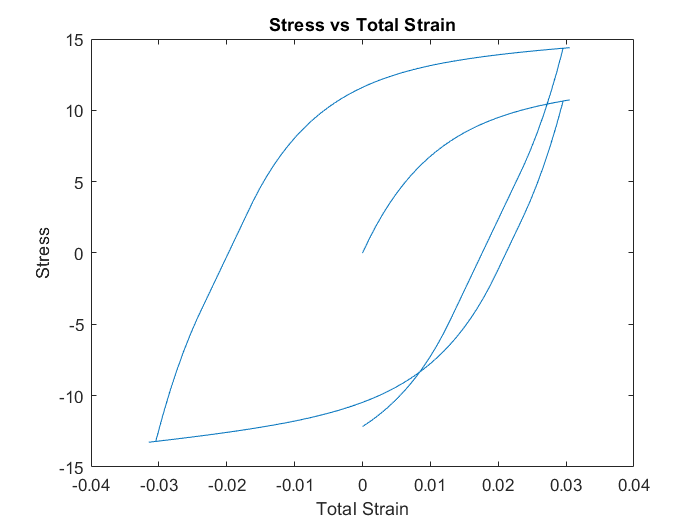
1. The L2-norm between analytical and FEM results was observed to decerease as we reduce the time step .

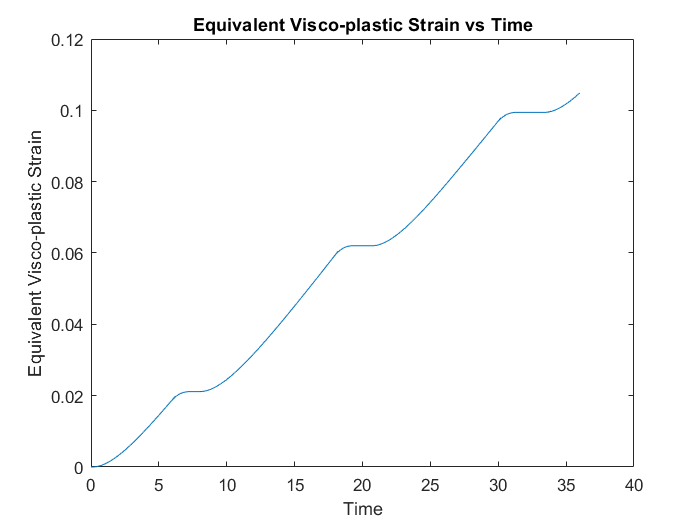
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| 0.4 | 3.6872 |  | 10 | 0.4932 |
| 0.2 | 3.276 |  | 5 | 0.3135 |
| 0.1 | 3.116 |  | 2.5 | 0.2873 |

1. We can also see that as we reduce the time step, the stress-strain plot for FEM comes closer to analytical plot.

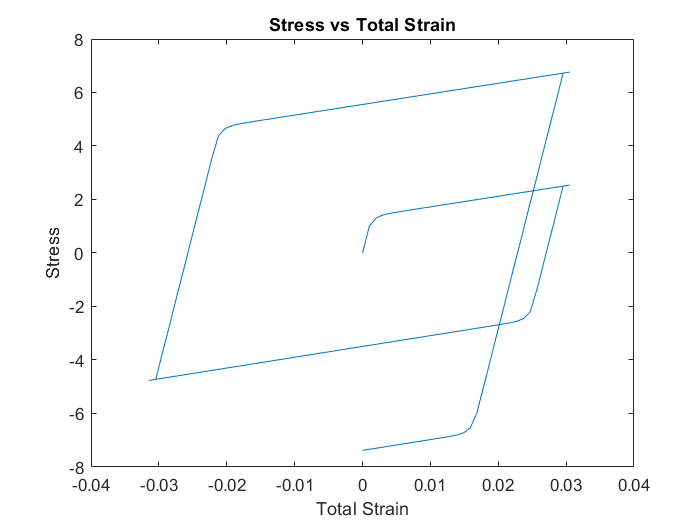
# t = 6 \* t1

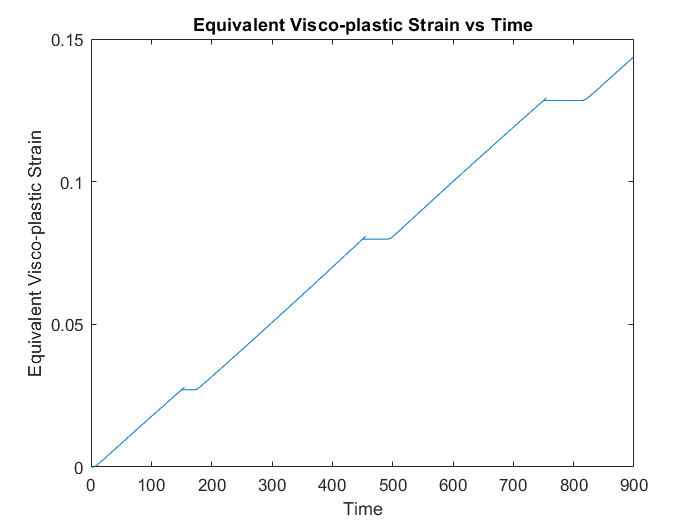






## 





## Observations:

* We can see the strain hardening effect in stress-strain plots